

# Adult Literacy Fundamental Mathematics: Book 3 – 2nd Edition



# Adult Literacy Fundamental Mathematics: Book 3 – 2nd Edition

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BCCAMPUS  
VICTORIA, B.C.



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Format	Internet required?	Device	Required apps	Accessibility Features	Screen reader compatible
Online webbook	Yes	Computer, tablet, phone	An Internet browser (Chrome, Firefox, Edge, or Safari)	WCAG 2.0 AA compliant, option to enlarge text, and compatible with browser text-to-speech tools	Yes
PDF	No	Computer, print copy	Adobe Reader (for reading on a computer) or a printer	Ability to highlight and annotate the text. If reading on the computer, you can zoom in.	Unsure
EPUB	No	Computer, tablet, phone	An eReader app	Option to enlarge text, change font style, size, and colour.	Unsure
HTML	No	Computer, tablet, phone	An Internet browser (Chrome, Firefox, Edge, or Safari)	WCAG 2.0 AA compliant and compatible with browser text-to-speech tools.	Yes

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## To the Learner

Welcome to *Adult Literacy Fundamental Mathematics: Book 3*.

You have the skills you need to be a strong student in this class. Your instructor knows this because you have passed the Adult Literacy Fundamental Mathematics Level 2 class, or you have been assessed into this level.

Adult math learners have many skills. They have a lot of life experience. They also use math in their everyday lives. This means that adult math learners may already know some of what is being taught in this book. Use what you already know with confidence!

## How to Use This Book

This textbook has:

- A **Table of Contents** listing the units, the major topics, and the subtopics.
- A **Glossary** giving definitions for mathematical vocabulary used in the course.
- A **Grades Record** to keep track of your marks.
- Many **Exercises** to practice what you learned. Some are quite short, but others have a great number of questions. You do not have to do every single question!
  - Do as many questions as you feel are necessary for you to be confident in your skill. It is best to do all the word problems.
  - If you leave out some questions, try doing every second or every third question. Always do some questions from the end of each exercise because the questions usually get harder at the end. You might use the skipped questions for review before a test.
  - If you are working on a difficult skill or concept, do half the exercise one day and finish the exercise the next day. That is a much better way to learn.
- **Self-tests** at the end of most topics have an “Aim” at the top. If you do not meet the aim, talk to your instructor, find what is causing the trouble, and do some more review before you go on.

**Mark            /18            Aim    15/18**

- A **Review and Extra Practice** section is at the end of each unit. If there is an area of the unit that you need extra practice in, you can use this. Or, if you want, you can use the section for more review.
- A **Practice Test** is available for each unit. You may:

- Write the practice test after you have studied the unit as a practice for the end-of-chapter test, OR
- You might want to write it before you start the unit to find what you already know and which areas you need to work on.
- **Unit Tests** are written after each unit. Again, you must reach the Aim before you begin the next unit. If you do not reach the aim, the instructor will assist you in finding and practising the difficult areas. When you are ready, you can write a B test to show that you have mastered the skills.
- A **Final Test** is to be written when you have finished the book. This final test will assess your skills from the whole book. You have mastered the skills in each unit and then kept using many of them throughout the course. The test reviews all those skills.

## Grades Record

You have also been given a sheet to write down your grades. After each test, you can write in the mark. This way you can keep track of your grades as you go through the course. This is a good idea to use in all your courses.

## Grade Record – Book 3

Unit	Practice Test	Date of Test A	Test A	Date of Test B	Test B
Example	✓	<i>September 4, 2020</i>	<i>25/33</i>	<i>September 7, 2020</i>	<i>25/33</i>
1					
2					
3					
Final Test					



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# How to Deal with Math Anxiety

## Emotions and Learning

Emotions, or what we feel about something, play a big part in how we learn. If we are calm, we learn well. If we are afraid or stressed, we do not learn as well.

Many people are afraid of math. They fear making a mistake. “Math anxiety” is the fear of math. People who suffer from math anxiety may get headaches, sick stomachs, cold hands, or they may just sweat a lot or just feel scared. Math anxiety can happen for a few different reasons:

- Feeling anxious when writing tests
- Negative experiences in a past math class
- Embarrassment in a past math class
- Social pressures and expectations to not like math or not do well in math
- The want to get everything right
- Negative self-message (“I don’t know how to do it,” or “I hate math”)

Math anxiety is a learned habit. If it is learned, it can be unlearned. Most math anxiety comes from bad memories while learning math. It may be from doing badly on a test or asking a question then being made fun of. These bad memories can make learning math hard.

Everyone can learn math. There is no special talent for math. There are some people who are better at math than others, but even these people had to learn to be good at math.

## Do You Suffer from Math Anxiety?

Read the list below and put a check mark beside the ones you feel when thinking about or doing math.

- Are your palms moist?
- Is your stomach fluttering?
- Do you feel like you can’t think clearly?
- Do you feel like you would rather do anything else than learn math?
- Are you breathing faster than normal?
- Is your heart pounding?
- Do you feel cold?
- Do you feel sweaty?

If you answered yes to two or more of these items, you may have math anxiety.

If you have math anxiety, a first step to understanding it is to look at where it all started.

Make a list of your experiences with learning math. Think back to the first math experiences you had and write about them. Think about learning math in school from the younger grades to the higher grades and write about your experiences and feelings. Include this class and how you are feeling right now about learning math.

Beside each experience, write if it was a positive or negative experience.

Look at the examples below to give you an idea:

Positive or negative?	Math experience
Negative	My teacher in elementary school lined the whole class up in a row and made us play a multiplication game. I could see which question was mine, and I didn't know the answer so I had to figure it out on my fingers before my turn came up. I got the answer right, but I was so nervous that I would be teased because I didn't know the answer off the top of my head. I still don't know my times tables.
Positive	In high school, I could use a calculator to figure out the simple multiplication problems, and then I could figure out the tougher problems without worrying about knowing my times tables.
Negative	Now that I am upgrading my math, I feel nervous every time I even think about opening the book. I want to get all the answers right, and I know that I won't be able to. I really need everything to be right so that I know that I am getting it.

Once you have made a list of experiences, go over the stories with your instructor, or by yourself and try to find some common themes.

- Can you see when you felt anxiety?
- Can you see why you are now anxious about math?
- Is there any experience you could use now to help you feel calmer about math?

Hopefully by examining the beginnings of the anxiety, you can feel more in control of it.

## How to Deal with Math Anxiety

Anyone can feel anxiety that will slow down learning. The key to learning is to be the “boss” of your anxiety. Here are an overview of some strategies that may help deal with your anxiety:

- Use breathing exercises
- Think positive math messages
- Know your textbook

- Understand test-taking anxiety

Remember, learning to deal with your math anxiety may take some time. It took you a long time to learn math anxiety, so it will take some time to overcome it.

## Use Breathing Exercises

One way to be the “boss” is to relax. Try this breathing exercise.

### Breathing Exercise

Start by breathing slowly to the count of four. It may help to close your eyes and count.

Now hold your breath for four counts and then let your breath out slowly to the count of four.

The counting is silent and should follow this pattern: “Breath in, two, three, four. Hold, two, three, four. Breath out, two, three, four. Wait, two, three, four.”

With practice, the number of counts can be increased. This is an easy and good way to relax.

Now, try this exercise quietly and repeat it five times slowly.

Each time you feel anxious about learning, use the breathing exercise to help calm yourself. Ask yourself if what you tried worked. Do you feel calmer?

## Think Positive Math Messages

Another way to be the “boss” is to give yourself positive math messages.

Read and think about the positive math messages listed below. Do you say any of those things to yourself?

- If the answer is yes, then great, keep doing that.
- If your answer is no, try to add this little mental trick to your day. The result will probably be that you start to see math as something you can do and that you may even like!

**I like math.**

**I am good at math.**

**I understand math.**

**I can relax when I am studying math.**

**I am capable of learning math.**

**Math is my friend.**

**My math improves every day.**

**I am relaxed, calm and confident when I study math.**

**I understand math when I give myself a chance.**

**Math is creative.**

Pick three statements that you like and say them to yourself as much as you can in each day. You can also write the statements out on paper and post them around your house so that you read them throughout the day.

### **Know Your Textbook**

Look at the Table of Contents in the front of your textbook. It tells you what you will be learning. You may see some things that you already know, some things that you may have forgotten, and some things that are new to you.

Flip the pages. You can see that the textbook is split into units. Each unit is something to learn.

Each unit has exercises to do. Notice the answers are at the end of the exercise. You can check your answers as soon as you are done. You can also check your answer before moving on if are not sure if you are doing the question right.

At the end of each unit is a self-test. It is a chance for you to see how well you have learned the skills in the unit. If you do well, you can move on. If you don't do well, you can go back and practice those skills.

Knowing your textbook gives you a good skill. If you get frustrated, you can use the Table of Contents to go back and find some help.

### **Understand Test-Taking Anxiety**

There are four reasons people are anxious when writing tests. Any of the four reasons listed below might be the reason a person might feel anxious in a test-taking situation.

1. Not feeling prepared for the test
2. Not sure how to write the test in the best way
3. Feeling too much mental pressure
4. Poor health habits before writing a test

Here is an explanation of each reason and how to work your way out of the anxiety you may feel during tests.



## 1. Not feeling prepared for the test

Many students feel anxiety about taking math tests because they do not feel prepared for the test. To feel prepared, a student needs to have studied the work and know that they can do the problems they will be given. Get help from your classmates, friends, or your instructor to find out how you can improve your study habits.

Getting ready for a test starts on the first day of class. Everything you do in class and at home is part of that getting ready.

- **Always do as many exercises as you need to help you understand.** Once you understand, do ten more questions, then you will know for sure that you really understand.
- **Always correct your exercises.** It is good to know that you are understanding and getting the questions right. It is also good to know if you are not understanding and need some help.
- **Always do the self-tests.** The self-tests can show things that you are not sure of.
- **Always do the review.** Review is part of this book. It is a chance to go over all the things you have learned in a unit before moving on. It prepares you for what will be on the test.
- **Always do a practice test.** A practice test gives you a chance to see how many questions and what kind of questions are on the test.

## 2. Not sure how to write the test in the best way

Here are some strategies students should know about how to write a test to do the best as possible on it:

- Before the Test
  1. **Arrive early.** Get out all the supplies you need to do the test (pencils, ruler, calculator, watch, etc.).
  2. **Be comfortable, but alert.** Choose a good spot in the room, and make sure you have enough space to work. Maintain a comfortable posture in your seat, but don't "slouch."
  3. **Stay relaxed and confident.** Keep a good attitude. If you find yourself anxious, take several slow, deep breaths to relax. Don't talk about the test to other students just before entering the room: their anxiety can be contagious.
- During the test.
  1. **Look over the test.** Take a look at the whole test before starting. This takes very little time. Use a highlighter to highlight the questions that you know you can do easily, note key terms, mark the test with comments that come to mind. As you work, put a star beside any questions that you would like to go over again when you finish the test.
  2. **Relax.** Before starting the test, imagine yourself somewhere where you are calm and confident. Go there in your mind. Focus on how good you feel and how in control you are. If you become anxious during the test, in your mind go to the

calming place. Focus on how calm you feel. Then go back to your test.

3. **Read the directions carefully.** This may be obvious, but it will help you avoid careless errors.
4. **Answer questions in a strategic order.**
  - Answer the easy questions first. This will help to build confidence and score points. It may also help you make connections with more difficult questions.
  - Then answer the difficult questions. Work on these harder questions with all the energy of the easier ones.
5. **Review your answers.** Resist the urge to leave as soon as you are done writing. Spend as much time as you can going over your test to see if you:
  - Answered all the questions.
  - Wrote the answers in right.
  - Did not make simple mistakes.

### 3. Feeling too much mental pressure

There are many reasons why a student may feel mental pressure when writing a test. Listed below are a few main reasons:

- Negative beliefs about one’s math abilities
- Low self-esteem when it comes to math
- Too high expectations of success
- Fear that failure or low grades will affect the future
- Feelings of pressure of not wanting to let down family members

When students feel this kind of pressure, it is very hard to feel calm and relaxed about a test. The key to success in a math test is to keep the anxiety at a manageable level. You can do this in two ways:

1. **Change negative self-talk.** Any time a negative thought creeps into your head, it will make it harder to stay positive and relaxed about your test. If you have a negative thought like “I can’t do it”, try to replace it with a positive thought like “I can do this”.
2. **Use relaxing and calming techniques.** Use the calming breathing mentioned earlier in this section. This will help you keep calm. Also, do not study in the last half hour before the test. You will be calmer by spending time relaxing and breathing deeply in that last half hour.

### 4. Poor health habits before writing a test

When your body and mind are healthy, you will have a better chance of doing well on a test. Eat well, drink plenty of water and get daily exercise. The better you feel, the better you can perform (and a test is a performance!).

# Unit 1: Multiplication



## Topic A: Multiplying Larger Numbers

It is usually easier to multiply larger numbers if they are written underneath each other. The bottom number is called the multiplier.

**To find the product of a one digit multiplier,** use as many of these steps as you need to complete each multiplication question:

- **Step 1:** Multiply the ones digit in the large number by the one-digit multiplier.
- **Step 2:** Multiply the tens digit in the large number by the multiplier.
- **Step 3:** Multiply the hundreds digit in the large number by the multiplier.
- **Step 4:** Multiply the thousands digit in the large number by the multiplier.

### Example A

$$62 \times 4 =$$

**Step 1:**  $4 \times 2 \text{ ones} = 8$

$$\begin{array}{r} 62 \\ \times 4 \\ \hline 8 \end{array}$$

**Step 2:**  $4 \times 6 \text{ tens} = 24 \text{ tens} = 2 \text{ hundreds and } 4 \text{ tens}$

$$\begin{array}{r} 62 \\ \times 4 \\ \hline 248 \end{array}$$

The product of  $62 \times 4$  is 248.

### Exercise 1

Find the product. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} 72 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 21 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 80 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 73 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 71 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 40 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 90 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 82 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 40 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 92 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 83 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 90 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 71 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 53 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 30 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 61 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 70 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 41 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 90 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 60 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 92 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \times 4 \\ \hline \end{array}$$

**Answers to Exercise 1**

a. 144

b. 405

c. 168

d. 480

e. 219

f. 213

g. 280

h. 810

i. 328

j. 200

k. 368

l. 249

m. 720

q. 567

u. 450

n. 639

r. 122

v. 540

o. 106

s. 560

w. 276

p. 180

t. 246

x. 324

## Example B

$523 \times 3 =$

$$\begin{array}{r} 523 \\ \times 3 \\ \hline 1569 \end{array}$$

**Step 1:**  $3 \times 3$  ones = 9 ones**Step 2:**  $3 \times 2$  tens = 6 tens**Step 3:**  $3 \times 5$  hundreds = 15 hundreds = 1 thousand and 5 hundredsThe product of  $523 \times 3$  is 1 569.

## Example C

$901 \times 8 =$

$$\begin{array}{r} 901 \\ \times 8 \\ \hline 7208 \end{array}$$

**Step 1:**  $8 \times 1$  one = 8 ones**Step 2:**  $8 \times 0$  tens = 0 tens**Step 3:**  $8 \times 9$  hundreds = 72 hundreds = 7 thousands and 2 hundredsThe product of  $901 \times 8$  is 7 208.

## Exercise 2

Find the product. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} 601 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 813 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 731 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 423 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 610 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 701 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 641 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 901 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 521 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 922 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 711 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 632 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 820 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 720 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 720 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 211 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 910 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 942 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 803 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 801 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 710 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 542 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 932 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 601 \\ \times 8 \\ \hline \end{array}$$

**Answers to Exercise 2**



a. 4 207

i. 2 439

q. 1 462

b. 1 269

j. 2 440

r. 3 505

c. 1 282

k. 5 406

s. 1 042

d. 3 688

l. 5 688

t. 1 896

e. 3 280

m. 2 160

u. 2 880

f. 1 055

n. 4 550

v. 1 884

g. 1 606

o. 4 806

w. 6 390

h. 1 084

p. 2 796

x. 4 808

## Renaming and Carrying

In the times tables, the products are often two digit numbers. You must rename and carry. The amount you carry is added onto the product of the next column.

### Example D

$$\begin{array}{r} 68 \\ \times 7 \\ \hline \end{array}$$

**Step 1:** Multiply the ones by the multiplier.

$$7 \times 8 \text{ ones} = 56 \text{ ones} = 5 \text{ tens} + 6 \text{ ones}$$

Write the 6 ones in the product.

Carry the 5 tens to the tens column and make a note of it for yourself. You might write it above the tens column.

$$\begin{array}{r} 5 \\ 68 \\ \times 7 \\ \hline 6 \end{array}$$

**Step 2:** Multiply the tens by the multiplier.

$$7 \times 6 \text{ tens} = 42 \text{ tens}$$

Now add on the 5 tens that you carried.

$$42 \text{ tens} + 5 \text{ tens} = 47 \text{ tens} = 4 \text{ hundreds and } 7 \text{ tens}$$

$$\begin{array}{r} 5 \\ 68 \\ \times 7 \\ \hline 476 \end{array}$$

## Exercise 3

Find the product. Check your work using the answer key at the end of the exercise.

a. 
$$\begin{array}{r} 16 \\ \times 8 \\ \hline \end{array}$$

g. 
$$\begin{array}{r} 48 \\ \times 6 \\ \hline \end{array}$$

m. 
$$\begin{array}{r} 56 \\ \times 3 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 62 \\ \times 6 \\ \hline \end{array}$$

h. 
$$\begin{array}{r} 17 \\ \times 2 \\ \hline \end{array}$$

n. 
$$\begin{array}{r} 47 \\ \times 5 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 37 \\ \times 4 \\ \hline \end{array}$$

i. 
$$\begin{array}{r} 26 \\ \times 4 \\ \hline \end{array}$$

o. 
$$\begin{array}{r} 39 \\ \times 6 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 14 \\ \times 9 \\ \hline \end{array}$$

j. 
$$\begin{array}{r} 54 \\ \times 7 \\ \hline \end{array}$$

p. 
$$\begin{array}{r} 75 \\ \times 6 \\ \hline \end{array}$$

e. 
$$\begin{array}{r} 36 \\ \times 7 \\ \hline \end{array}$$

k. 
$$\begin{array}{r} 58 \\ \times 8 \\ \hline \end{array}$$

q. 
$$\begin{array}{r} 38 \\ \times 5 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 92 \\ \times 9 \\ \hline \end{array}$$

l. 
$$\begin{array}{r} 45 \\ \times 4 \\ \hline \end{array}$$

r. 
$$\begin{array}{r} 82 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 98 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 47 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 56 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 29 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 74 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 98 \\ \times 4 \\ \hline \end{array}$$

**Answers to Exercise 3**

a. 128

i. 104

q. 190

b. 372

j. 378

r. 574

c. 148

k. 464

s. 294

d. 126

l. 180

t. 145

e. 252

m. 168

u. 141

f. 828

n. 235

v. 592

g. 288

o. 234

w. 280

h. 34

p. 450

x. 392

## Example E

$$4 \times 224 = \begin{array}{r} 224 \\ \times 4 \\ \hline \end{array}$$

**Step 1:**  $4 \times 4$  ones = 16 ones = 1 ten and 6 ones

Write the 6 ones in the product and carry the one ten.

$$\begin{array}{r} 1 \\ 224 \\ \times 4 \\ \hline 6 \end{array}$$

**Step 2:**  $4 \times 2$  tens = 8 tens

8 tens + 1 ten we carried = 9 tens

$$\begin{array}{r} 1 \\ 224 \\ \times 4 \\ \hline 96 \end{array}$$

**Step 3:**  $4 \times 2$  hundreds = 8 hundreds

$$\begin{array}{r} 1 \\ 224 \\ \times 4 \\ \hline 896 \end{array}$$

#### Example F

$$4 \times 456 = \begin{array}{r} 456 \\ \times 5 \\ \hline \end{array}$$

**Step 1:**  $5 \times 6$  ones = 30 ones = 3 ten and 0 ones

The 0 must be written to hold the ones place. Carry the 3 tens.

$$\begin{array}{r} 3 \\ 456 \\ \times 5 \\ \hline 0 \end{array}$$

**Step 2:**  $5 \times 5$  tens = 25 tens

25 tens + 3 tens = 28 tens = 2 hundreds and 8 tens

Write the 8 tens in the product. Carry the 2 hundreds.

$$\begin{array}{r} 23 \\ 456 \\ \times 5 \\ \hline 80 \end{array}$$

**Step 3:**  $5 \times 4$  hundreds = 20 hundreds + 2 hundreds = 22 hundreds = 2 thousands and 2 hundreds

$$\begin{array}{r} 23 \\ 456 \\ \times \quad 5 \\ \hline 2280 \end{array}$$

## Exercise 4

Find the products. Check your work using the answer key at the end of the exercise.

a. 
$$\begin{array}{r} 648 \\ \times \quad 9 \\ \hline \end{array}$$

g. 
$$\begin{array}{r} 407 \\ \times \quad 8 \\ \hline \end{array}$$

m. 
$$\begin{array}{r} 248 \\ \times \quad 3 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 240 \\ \times \quad 7 \\ \hline \end{array}$$

h. 
$$\begin{array}{r} 239 \\ \times \quad 6 \\ \hline \end{array}$$

n. 
$$\begin{array}{r} 604 \\ \times \quad 6 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 457 \\ \times \quad 8 \\ \hline \end{array}$$

i. 
$$\begin{array}{r} 118 \\ \times \quad 9 \\ \hline \end{array}$$

o. 
$$\begin{array}{r} 239 \\ \times \quad 4 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 404 \\ \times \quad 2 \\ \hline \end{array}$$

j. 
$$\begin{array}{r} 425 \\ \times \quad 7 \\ \hline \end{array}$$

p. 
$$\begin{array}{r} 576 \\ \times \quad 3 \\ \hline \end{array}$$

e. 
$$\begin{array}{r} 106 \\ \times \quad 9 \\ \hline \end{array}$$

k. 
$$\begin{array}{r} 139 \\ \times \quad 8 \\ \hline \end{array}$$

q. 
$$\begin{array}{r} 857 \\ \times \quad 6 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 156 \\ \times \quad 4 \\ \hline \end{array}$$

l. 
$$\begin{array}{r} 565 \\ \times \quad 2 \\ \hline \end{array}$$

r. 
$$\begin{array}{r} 478 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 674 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 893 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 952 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 629 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 583 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 293 \\ \times 7 \\ \hline \end{array}$$

**Answers to Exercise 4**

a. 5 832

i. 1 062

q. 5 142

b. 1 680

j. 2 975

r. 4 302

c. 3 656

k. 1 112

s. 4 718

d. 808

l. 1 130

t. 5 032

e. 954

m. 744

u. 4 465

f. 624

n. 3 624

v. 4 664

g. 3 256

o. 956

w. 8 568

h. 1 434

p. 1 728

x. 2 051

## Example G

$$\begin{array}{r} 2408 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 37 \\ 2408 \\ \times 9 \\ \hline 21672 \end{array}$$

**Step 1:**  $9 \times 8$  ones = 72 ones = 7 tens and 2 ones**Step 2:**  $9 \times 0 = 0$  tens. 0 tens + 7 tens = 7 tens**Step 3:**  $9 \times 4$  hundreds = 36 hundreds = 3 thousands and 6 hundreds**Step 4:**  $9 \times 2$  thousands = 18 thousands. 18 thousands + 3 thousands = 21 thousands

## Exercise 5

Find the products. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} 4103 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 5394 \\ \times \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 7689 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 6087 \\ \times \quad 4 \\ \hline \end{array}$$

$$\begin{array}{r} 2034 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 5160 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3280 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8652 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4256 \\ \times \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7034 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6392 \\ \times \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5491 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8456 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 4187 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8032 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 4758 \\ \times \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} 1376 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 8645 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} 4735 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3297 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 6453 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} 5402 \\ \times \quad 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9628 \\ \times \quad 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8129 \\ \times \quad 4 \\ \hline \end{array}$$

**Answers to Exercise 5**

24 Unit 1: Multiplication

a. 32 824

b. 24 348

c. 19 680

d. 35 170

e. 16 912

f. 33 306

g. 14 205

h. 48 618

i. 21 576

j. 16 272

k. 43 260

l. 44 744

m. 25 122

n. 12 384

o. 6 594

p. 28 884

q. 61 512

r. 15 480

s. 29 792

t. 27 455

u. 72 288

v. 51 870

w. 12 906

x. 32 516



**Topic A: Self-Test****Mark /14 Aim 11/14**

A. Find the products. (6 marks)

$$\begin{array}{r} 62 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 734 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 31 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8342 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 423 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 5231 \\ \times 3 \\ \hline \end{array}$$

B. Multiply these numbers. (4 marks)

$$\begin{array}{r} 44 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 207 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 69 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 184 \\ \times 6 \\ \hline \end{array}$$

C. Find the products. (4 marks)

$$\begin{array}{r} 2834 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9241 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4037 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 3652 \\ \times 4 \\ \hline \end{array}$$

### Answers to Topic A Self-Test

A. Find the products.

a. 249

b. 124

c. 1 269

d. 1 468

e. 16 684

f. 15 693

B. Multiply these numbers.

a. 308

b. 552

c. 1 863

d. 1 104

C. Find the products.

a. 14 170

b. 24 222

c. 73 928

d. 14 608

## Topic B: Two- and Three-Digit Multipliers

When the multiplier is more than one digit, you use the same process and get partial products. You repeat the steps until you have multiplied by every digit, then add the partial products together.

### Multiplying by Two-Digit Multipliers

#### Example A

$$24 \times 23 =$$

**Part 1:** Multiply by the ones digit in the multiplier.

Multiply 3 ones by 24 using the method you already know. The first partial product is 72.

$$\begin{array}{r} 1 \\ 24 \\ \times 23 \\ \hline 72 \end{array}$$

**Part 2:** Multiply by the tens digit in the multiplier. First, put a 0 to hold the ones place in your partial product. We are multiplying by a ten, so we hold the ones place.

**Step 1:** Multiply 2 tens 4 ones = 8 tens Write the 8 tens under the tens in your first partial product. It is very important to keep the columns straight – ones under one, tens under tens.

**Step 2:** Multiply 2 tens 2 tens = 4 hundreds Write the 4 hundreds in your partial product. The second partial product is 480.

$$\begin{array}{r} 1 \\ 24 \\ \times 23 \\ \hline 72 \\ 480 \end{array}$$

**Part 3:** Add the partial products together, being sure to add ones to ones, tens to tens, hundreds to hundreds. The sum is the final product.

Draw a line under the partial products. Add. Check your addition.

$$\begin{array}{r}
 1 \\
 24 \\
 \times 23 \\
 \hline
 72 \\
 + 480 \\
 \hline
 552
 \end{array}$$

## Example B

$$36 \times 425 =$$

**Part 1:** Multiply by the ones digit in the multiplier.  $6 \times 425 = 2\,550$

$$\begin{array}{r}
 1\ 3 \\
 425 \\
 \times 36 \\
 \hline
 2550
 \end{array}$$

**Part 2:** Multiply by the tens digit in the multiplier. First put a 0 to hold the ones place in the second partial product.

- **Step 1:**  $3\text{ tens} \times 5\text{ tens} = 15\text{ tens} = 1\text{ hundred and }5\text{ tens}$   
Write the 5 tens in the second partial product and carry the 1 hundred. Now you can see why it is best to cross out the numbers you carry as soon as you have added them to the product.
- **Step 2:**  $3\text{ tens} \times 2\text{ tens} = 6\text{ hundreds}$   
 $6\text{ hundreds} + 1\text{ hundred (carried)} = 7\text{ hundreds}$ . There is nothing to carry.
- **Step 3:**  $3\text{ tens} \times 4\text{ hundreds} = 12\text{ thousands}$

$$\begin{array}{r}
 1 \\
 1\ 3 \\
 425 \\
 \times 36 \\
 \hline
 2550 \\
 12750
 \end{array}$$

**Part 3:** Add the partial products together.

$$\begin{array}{r}
 1 \\
 13 \\
 425 \\
 \times \quad 36 \\
 \hline
 2550 \\
 + 12750 \\
 \hline
 15300
 \end{array}$$

Tip: Keeping the columns straight with ones under ones, tens under tens, hundreds under hundreds is very important. Working on large-squared graphing paper using one digit per square is often helpful.

tens  $\times$  tens = hundreds  
 tens  $\times$  hundreds = thousands

### Exercise 1

Multiply, being very careful to keep the columns straight when you write your partial products. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r}
 84 \\
 \times \quad 12 \\
 \hline
 168 \\
 + \quad 840 \\
 \hline
 1008
 \end{array}$$

a. 
$$\begin{array}{r}
 73 \\
 \times \quad 12 \\
 \hline
 \end{array}$$

b. 
$$\begin{array}{r}
 50 \\
 \times \quad 42 \\
 \hline
 \end{array}$$

c. 
$$\begin{array}{r}
 62 \\
 \times \quad 31 \\
 \hline
 \end{array}$$

$$\begin{array}{r} \text{d.} \quad 61 \\ \times 42 \\ \hline \end{array}$$

$$\begin{array}{r} \text{j.} \quad 41 \\ \times 53 \\ \hline \end{array}$$

$$\begin{array}{r} \text{p.} \quad 60 \\ \times 31 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 91 \\ \times 53 \\ \hline \end{array}$$

$$\begin{array}{r} \text{k.} \quad 42 \\ \times 94 \\ \hline \end{array}$$

$$\begin{array}{r} \text{q.} \quad 55 \\ \times 73 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 92 \\ \times 31 \\ \hline \end{array}$$

$$\begin{array}{r} \text{l.} \quad 80 \\ \times 86 \\ \hline \end{array}$$

$$\begin{array}{r} \text{r.} \quad 84 \\ \times 56 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g.} \quad 91 \\ \times 49 \\ \hline \end{array}$$

$$\begin{array}{r} \text{m.} \quad 31 \\ \times 79 \\ \hline \end{array}$$

$$\begin{array}{r} \text{s.} \quad 53 \\ \times 38 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h.} \quad 72 \\ \times 48 \\ \hline \end{array}$$

$$\begin{array}{r} \text{n.} \quad 54 \\ \times 40 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i.} \quad 53 \\ \times 30 \\ \hline \end{array}$$

$$\begin{array}{r} \text{o.} \quad 61 \\ \times 48 \\ \hline \end{array}$$

**Answers to Exercise 1**

a. 876

b. 2 100

c. 1 922

d. 2 562

j. 2 173

p. 1 860

e. 4 823

k. 3 948

q. 4 015

f. 2 852

l. 6 880

r. 4 704

g. 4 459

m. 2 449

s. 2 014

h. 3 456

n. 2 160

i. 1 590

o. 2 928

When the multiplier has a zero in the ones place, use this shortcut.

#### Example C

$$\begin{array}{r} 48 \\ \times 80 \\ \hline 3840 \end{array}$$

- **Step 1:**  $0 \text{ ones} \times 48 = 0$ . Place one zero in the product and that will hold the ones place.
- **Step 2:** Multiply by the tens digit and write the product beside the zero.

#### Example D

$$\begin{array}{r} 97 \\ \times 20 \\ \hline 1940 \end{array}$$

#### Exercise 2

Find the products. Use the shortcut for multipliers with a zero in them. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} 76 \\ \times 70 \\ \hline 5320 \end{array}$$

a.  $\begin{array}{r} 52 \\ \times 70 \\ \hline \end{array}$

i.  $\begin{array}{r} 432 \\ \times 70 \\ \hline \end{array}$

q.  $\begin{array}{r} 9025 \\ \times 70 \\ \hline \end{array}$

b.  $\begin{array}{r} 91 \\ \times 70 \\ \hline \end{array}$

j.  $\begin{array}{r} 863 \\ \times 70 \\ \hline \end{array}$

r.  $\begin{array}{r} 8907 \\ \times 70 \\ \hline \end{array}$

c.  $\begin{array}{r} 83 \\ \times 70 \\ \hline \end{array}$

k.  $\begin{array}{r} 907 \\ \times 70 \\ \hline \end{array}$

s.  $\begin{array}{r} 300 \\ \times 70 \\ \hline \end{array}$

d.  $\begin{array}{r} 49 \\ \times 70 \\ \hline \end{array}$

l.  $\begin{array}{r} 503 \\ \times 70 \\ \hline \end{array}$

t.  $\begin{array}{r} 9075 \\ \times 70 \\ \hline \end{array}$

e.  $\begin{array}{r} 61 \\ \times 70 \\ \hline \end{array}$

m.  $\begin{array}{r} 452 \\ \times 70 \\ \hline \end{array}$

u.  $\begin{array}{r} 3952 \\ \times 70 \\ \hline \end{array}$

f.  $\begin{array}{r} 16 \\ \times 70 \\ \hline \end{array}$

n.  $\begin{array}{r} 943 \\ \times 70 \\ \hline \end{array}$

v.  $\begin{array}{r} 1528 \\ \times 70 \\ \hline \end{array}$

g.  $\begin{array}{r} 36 \\ \times 70 \\ \hline \end{array}$

o.  $\begin{array}{r} 248 \\ \times 70 \\ \hline \end{array}$

w.  $\begin{array}{r} 7106 \\ \times 70 \\ \hline \end{array}$

h.  $\begin{array}{r} 398 \\ \times 70 \\ \hline \end{array}$

p.  $\begin{array}{r} 6287 \\ \times 70 \\ \hline \end{array}$

**Answers to Exercise 2**

a. 3 640

b. 6 370

c. 5 810



d. 3 430

k. 63 490

r. 623 490

e. 4 270

l. 35 210

s. 21 000

f. 1 120

m. 31 640

t. 635 250

g. 2 520

n. 66 010

u. 276 640

h. 27 860

o. 17 360

v. 106 960

i. 30 240

p. 440 090

w. 497 420

j. 60 410

q. 631 750

How are you doing? Ask your instructor for help if you are not comfortable with multiplying.

## Multiplying by Three-Digit Multipliers

To multiply by three digit multipliers, use the same method with one more part.

Example E

$$417 \times 368 =$$

$$\begin{array}{r}
 417 \\
 \times 368 \\
 \hline
 3336 \\
 25020 \\
 + 125100 \\
 \hline
 153456
 \end{array}$$

- **Part 1:** Multiply by the 8 ones.
- **Part 2:** Multiply the 6 tens; hold the ones place with 0.
- **Part 3:** Multiply by the 3 hundreds. Put 00 to hold the ones and tens places in the third partial product.
  - **Step 1:** 3 hundreds  $\times$  7 ones = 21 hundreds = 2 thousands and 1 hundred. Write the 1 hundred and carry the 2 thousands.

- **Step 2:** 3 hundreds  $\times$  1 ten = 3 thousands. 3 thousands + 2 thousands (carried) = 5 thousands.
- **Step 3:** 3 hundreds  $\times$  4 hundreds = 12 ten thousands.
- **Part 4:** Add the partial products.

## Exercise 3

Find the products. Check your work using the answer key at the end of the exercise.

a. 
$$\begin{array}{r} 416 \\ \times 213 \\ \hline \end{array}$$

e. 
$$\begin{array}{r} 984 \\ \times 469 \\ \hline \end{array}$$

i. 
$$\begin{array}{r} 613 \\ \times 368 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 375 \\ \times 291 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 489 \\ \times 578 \\ \hline \end{array}$$

j. 
$$\begin{array}{r} 725 \\ \times 547 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 361 \\ \times 475 \\ \hline \end{array}$$

g. 
$$\begin{array}{r} 498 \\ \times 123 \\ \hline \end{array}$$

k. 
$$\begin{array}{r} 269 \\ \times 912 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 275 \\ \times 863 \\ \hline \end{array}$$

h. 
$$\begin{array}{r} 267 \\ \times 854 \\ \hline \end{array}$$

l. 
$$\begin{array}{r} 752 \\ \times 697 \\ \hline \end{array}$$

$$\begin{array}{r} \text{m.} \quad 983 \\ \times 357 \\ \hline \end{array}$$

$$\begin{array}{r} \text{n.} \quad 835 \\ \times 148 \\ \hline \end{array}$$

$$\begin{array}{r} \text{o.} \quad 386 \\ \times 296 \\ \hline \end{array}$$

**Answers to Exercise 3**

a. 88 608

f. 282 642

k. 245 328

b. 109 125

g. 61 254

l. 524 144

c. 171 475

h. 228 018

m. 350 931

d. 237 325

i. 225 584

n. 123 580

e. 461 496

j. 396 575

o. 114 256

You know to hold the ones place with a zero if the multiplier has a zero in the ones place. Use the same skill if the multiplier has a zero in the tens place.

## Example F

$$927 \times 405 =$$

$$\begin{array}{r} 927 \\ \times 405 \\ \hline 4635 \\ + 370800 \\ \hline 375435 \end{array}$$

- **Part 1:** Multiply by the 5 ones.
- **Part 2:** Multiply by the 0 tens. Hold the ones place with a 0;  $0 \times 927 = 0$ ; Place one zero in the tens place in the second partial product.
- **Part 3:** Multiply by the 4 hundreds. The ones and tens places are already held by zeros. Start this partial product in the hundreds place on the same line.
- **Part 4:** Add the partial products.

## Exercise 4

Find the products. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r}
 22 \\
 698 \\
 \times 301 \\
 \hline
 698 \\
 + 209400 \\
 \hline
 210098
 \end{array}$$

a. 
$$\begin{array}{r} 923 \\ \times 403 \\ \hline \end{array}$$

e. 
$$\begin{array}{r} 625 \\ \times 405 \\ \hline \end{array}$$

i. 
$$\begin{array}{r} 432 \\ \times 405 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 830 \\ \times 108 \\ \hline \end{array}$$

f. 
$$\begin{array}{r} 275 \\ \times 306 \\ \hline \end{array}$$

j. 
$$\begin{array}{r} 625 \\ \times 409 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 482 \\ \times 206 \\ \hline \end{array}$$

g. 
$$\begin{array}{r} 765 \\ \times 506 \\ \hline \end{array}$$

k. 
$$\begin{array}{r} 175 \\ \times 306 \\ \hline \end{array}$$

d. 
$$\begin{array}{r} 432 \\ \times 205 \\ \hline \end{array}$$

h. 
$$\begin{array}{r} 1576 \\ \times 702 \\ \hline \end{array}$$

l. 
$$\begin{array}{r} 5874 \\ \times 309 \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{m.} \phantom{\times} \phantom{104} \\ \phantom{m.} \phantom{\times} 7384 \\ \times \phantom{104} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{n.} \phantom{\times} \phantom{603} \\ \phantom{n.} \phantom{\times} 6538 \\ \times \phantom{603} \\ \hline \end{array}$$

**Answers to Exercise 4**

a. 371 969

f. 84 150

k. 53 550

b. 89 640

g. 387 090

l. 1 815 066

c. 99 292

h. 1 106 352

m. 767 936

d. 88 560

i. 174 960

n. 3 942 414

e. 255 625

j. 255 625

**Multiplying by 10, 100, and 1 000**

## Exercise 5

Do the following questions and see if you can find the pattern. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} \phantom{a.} \phantom{\times} \phantom{10} \\ \phantom{a.} \phantom{\times} 83 \\ \times \phantom{10} \\ \hline 830 \end{array}$$

$$\begin{array}{r} \phantom{e.} \phantom{\times} \phantom{10} \\ \phantom{e.} \phantom{\times} 70 \\ \times \phantom{10} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{i.} \phantom{\times} \phantom{100} \\ \phantom{i.} \phantom{\times} 45 \\ \times \phantom{100} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{b.} \phantom{\times} \phantom{10} \\ \phantom{b.} \phantom{\times} 46 \\ \times \phantom{10} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{f.} \phantom{\times} \phantom{10} \\ \phantom{f.} \phantom{\times} 129 \\ \times \phantom{10} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{j.} \phantom{\times} \phantom{100} \\ \phantom{j.} \phantom{\times} 26 \\ \times \phantom{100} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{c.} \phantom{\times} \phantom{10} \\ \phantom{c.} \phantom{\times} 97 \\ \times \phantom{10} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{g.} \phantom{\times} \phantom{10} \\ \phantom{g.} \phantom{\times} 1852 \\ \times \phantom{10} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{k.} \phantom{\times} \phantom{100} \\ \phantom{k.} \phantom{\times} 432 \\ \times \phantom{100} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{d.} \phantom{\times} \phantom{10} \\ \phantom{d.} \phantom{\times} 123 \\ \times \phantom{10} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{h.} \phantom{\times} \phantom{10} \\ \phantom{h.} \phantom{\times} 29871 \\ \times \phantom{10} \\ \hline \end{array}$$

$$\begin{array}{r} \phantom{l.} \phantom{\times} \phantom{100} \\ \phantom{l.} \phantom{\times} 679 \\ \times \phantom{100} \\ \hline \end{array}$$

$$\begin{array}{r} \text{m.} \quad 2482 \\ \times \quad 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{q.} \quad 23 \\ \times \quad 1000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{u.} \quad 2118 \\ \times \quad 1000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{n.} \quad 9037 \\ \times \quad 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{r.} \quad 452 \\ \times \quad 1000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{v.} \quad 2431 \\ \times \quad 1000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{o.} \quad 46207 \\ \times \quad 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{s.} \quad 207 \\ \times \quad 1000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{w.} \quad 23681 \\ \times \quad 1000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{p.} \quad 97512 \\ \times \quad 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{t.} \quad 348 \\ \times \quad 1000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{x.} \quad 48203 \\ \times \quad 1000 \\ \hline \end{array}$$

**Answers to Exercise 5**

a. 830

i. 4 500

q. 23 000

b. 460

j. 2 600

r. 452 000

c. 970

k. 43 200

s. 207 000

d. 1 230

l. 67 900

t. 348 000

e. 700

m. 248 200

u. 2 118 000

f. 1 290

n. 903 700

v. 2 431 000

g. 18 520

o. 4 620 700

w. 23 681 000

h. 298 710

p. 9 751 200

x. 48 203 000

And the pattern is ...

When multiplying by 10, 100, 1 000, 10 000, etc., place as many zeros to the right of the number as there are zeros in the 10, 100, 1 000, etc.

- To multiply by 10 put one zero after the number.
- To multiply by 100 put two zeros after the number.
- To multiply by 1 000 put three zeros after the number.

## Exercise 6

Find the products using the short method. Do not rewrite the questions. Check your work using the answer key at the end of the exercise.

a.  $12 \times 10 = 120$

b.  $10 \times 3\,175 =$

c.  $162 \times 10 =$

d.  $10 \times 53\,821 =$

e.  $10 \times 123 =$

f.  $27\,342 \times 10 =$

g.  $10 \times 98 =$

h.  $1\,134 \times 10 =$

i.  $15 \times 100 =$

j.  $100 \times 278 =$

k.  $9\,134 \times 100 =$

l.  $651 \times 100 =$

m.  $100 \times 5\,169 =$

n.  $100 \times 24\,815 =$

o.  $10 \times 905 =$

p.  $45\,683 \times 10 =$

q.  $1\,000 \times 87 =$

r.  $521 \times 1\,000 =$

s.  $1\,000 \times 68\,935 =$

t.  $1\,000 \times 8\,902 =$

u.  $1\,576 \times 1\,000 =$

v.  $31\,584 \times 1\,000 =$

w.  $1\,000 \times 426 =$

x.  $72 \times 1\,000 =$

**Answers for Exercise 6**

a. 120

b. 31 750

c. 1 620

d. 538 210

e. 1 230

f. 273 420

g. 980

h. 11 340

i. 1 500

j. 27 800

k. 913 400

l. 65 100

m. 516 900

n. 2 481 500

o. 9 050

p. 456 830

q. 87 000

r. 521 000

s. 68 935 000

t. 8 902 000

u. 1 576 000

v. 31 584 000

w. 426 000

x. 72 000

**Topic B: Self-Test****Mark /12 Aim 10/12**

A. Multiply these numbers.

$$\begin{array}{r} 47 \\ \times 39 \\ \hline \end{array}$$

$$\begin{array}{r} 678 \\ \times 39 \\ \hline \end{array}$$

$$\begin{array}{r} 8047 \\ \times 236 \\ \hline \end{array}$$

$$\begin{array}{r} 58 \\ \times 93 \\ \hline \end{array}$$

$$\begin{array}{r} 4579 \\ \times 86 \\ \hline \end{array}$$

$$\begin{array}{r} 4238 \\ \times 197 \\ \hline \end{array}$$

$$\begin{array}{r} 48 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} 8703 \\ \times 93 \\ \hline \end{array}$$

$$\begin{array}{r} 8200 \\ \times 444 \\ \hline \end{array}$$

$$\begin{array}{r} 982 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 7390 \\ \times 85 \\ \hline \end{array}$$

$$\begin{array}{r} 7265 \\ \times 409 \\ \hline \end{array}$$

**Answers to Topic B Self-Test**

A. Multiply these numbers.

a. 1 833

e. 26 442

i. 1 899 092

b. 5 394

f. 393 794

j. 834 886

c. 4 800

g. 809 379

k. 3 640 800

d. 982 000

h. 628 150

l. 3 012 285



## Topic C: Estimating Products

Before you practice estimating products, look at the easy multiplication that can be done when the factors end in zeros.

You already know how to quickly multiply by 10, 100, 1 000, etc...

You can find the products in questions like these using regular multiplication:

**But here is a shortcut:**

1. Count all the zeros at the end of the numbers in both factors.
2. Write down that many zeros at the end of the product.
3. Multiply the other digits in the usual way and put them before the zeros.

Example A

$$30 \times 500 =$$

- How many zeros at the end of the factors? **3**
- Write them down. **000**
- Multiply the other digits and put them before the zeros.  **$3 \times 5 = 15$**

$$30 \times 500 = 15\,000$$

Example B

$$400 \times 3\,000 =$$

- How many zeros at the end of the factors? **5**
- Write them down. **00 000**
- Multiply the other digits and put them before the zeros.  **$4 \times 3 = 12$**

$$400 \times 3\,000 = 1\,200\,000$$

## Exercise 1

Find the products using the shortcut. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} \text{a.} \quad 300 \\ \times \quad 20 \\ \hline 6000 \end{array}$$

$$\begin{array}{r} \text{i.} \quad 5000 \\ \times \quad 50 \\ \hline \end{array}$$

$$\begin{array}{r} \text{q.} \quad 40000 \\ \times \quad 800 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 6000 \\ \times \quad 200 \\ \hline \end{array}$$

$$\begin{array}{r} \text{j.} \quad 70 \\ \times \quad 80 \\ \hline \end{array}$$

$$\begin{array}{r} \text{r.} \quad 2400 \\ \times \quad 70 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 210 \\ \times \quad 20 \\ \hline \end{array}$$

$$\begin{array}{r} \text{k.} \quad 3000 \\ \times \quad 700 \\ \hline \end{array}$$

$$\begin{array}{r} \text{s.} \quad 390 \\ \times \quad 40 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 800 \\ \times \quad 600 \\ \hline \end{array}$$

$$\begin{array}{r} \text{l.} \quad 50000 \\ \times \quad 900 \\ \hline \end{array}$$

$$\begin{array}{r} \text{t.} \quad 7200 \\ \times \quad 5000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 400 \\ \times \quad 500 \\ \hline \end{array}$$

$$\begin{array}{r} \text{m.} \quad 9000 \\ \times \quad 8000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{u.} \quad 7000 \\ \times \quad 7000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 6000 \\ \times \quad 90 \\ \hline \end{array}$$

$$\begin{array}{r} \text{n.} \quad 60000 \\ \times \quad 90 \\ \hline \end{array}$$

$$\begin{array}{r} \text{v.} \quad 61000 \\ \times \quad 400 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g.} \quad 50000 \\ \times \quad 6000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{o.} \quad 90000 \\ \times \quad 2000 \\ \hline \end{array}$$

$$\begin{array}{r} \text{w.} \quad 5200 \\ \times \quad 300 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h.} \quad 80000 \\ \times \quad 30 \\ \hline \end{array}$$

$$\begin{array}{r} \text{p.} \quad 600 \\ \times \quad 600 \\ \hline \end{array}$$

$$\begin{array}{r} \text{x.} \quad 40 \\ \times \quad 60 \\ \hline \end{array}$$

**Answers to Exercise 1**

- |                |                |               |
|----------------|----------------|---------------|
| a. 6 000       | i. 250 000     | q. 32 000 000 |
| b. 1 200 000   | j. 5 600       | r. 168 000    |
| c. 4 200       | k. 2 100 000   | s. 15 600     |
| d. 480 000     | l. 45 000 000  | t. 36 000 000 |
| e. 200 000     | m. 72 000 000  | u. 49 000 000 |
| f. 540 000     | n. 5 400 000   | v. 24 400 000 |
| g. 300 000 000 | o. 180 000 000 | w. 1 560 000  |
| h. 2 400 000   | p. 360 000     | x. 2 400      |

To find an estimated product, round the factors before you multiply. If a factor has only one digit, do not round it.

#### Example C

$$\begin{array}{r} 6258 \\ \times \quad 3 \\ \hline \end{array}$$

6 258 rounds to 6 000. Leave 3 as is.

$$\begin{array}{r} 6000 \\ \times \quad 3 \\ \hline 18000 \end{array}$$

18 000 is the estimated product.

#### Example D

$$\begin{array}{r} 491 \\ \times \quad 24 \\ \hline \end{array}$$

491 rounds to 500. 24 rounds to 20.

$$\begin{array}{r} 500 \\ \times 20 \\ \hline 10000 \end{array}$$

10 000 is the estimated product.

## Topic C: Self-Test

Mark /18 Aim 15/18

A. Multiply these numbers.

$$\begin{array}{r} \text{a.} \quad 600 \\ \times \quad 70 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 5000 \\ \times \quad 600 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 400 \\ \times \quad 50 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 9000 \\ \times \quad 30 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 3000 \\ \times \quad 500 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 8000 \\ \times \quad 1000 \\ \hline \end{array}$$

B. Find an estimated product.

$$\begin{array}{r} \text{a.} \quad 87 \\ \times \quad 23 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 9421 \\ \times \quad 75 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 365 \\ \times \quad 455 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 268 \\ \times \quad 25 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 2632 \\ \times \quad 49 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 7264 \\ \times \quad 590 \\ \hline \end{array}$$

### Answers to Topic C Self-Test

A. Multiply these numbers.

1. 42 000

3. 3 000 000

5. 20 000

2. 270 000

4. 1 500 000

6. 8 000 000

B. Find an estimated product.

a.  $90 \times 20 = 1\,800$

c.  $9\,000 \times 80 = 720\,000$

e.  $400 \times 500 = 200\,000$

b.  $300 \times 30 = 9\,000$

d.  $3\,000 \times 50 = 150\,000$

f.  $7\,000 \times 600 = 4\,200\,000$



## Topic D: Multiplication Problems

Multiplication problems usually give information for one unit and ask information for many units. For example, you may be given an average distance for one hour and asked for a distance for six hours. You may be given the price for one item and asked the price for 96 items.

Remember that multiplication is fast addition of equal amounts. Key words for addition may also point to multiplication.

### Key words that point to multiplication:

- altogether
- combined
- in all
- total
- the average is
- product
- how many?
- how much?
- each

### Exercise 1

Do these problems by following the five problem-solving steps. Remember to circle the information and underline what is being asked. Be sure to write down your estimation before you find the actual solution. Check your work using the answer key at the end of the exercise.

- Maria spent \$151 a month to ride to work. How much did it cost her to ride to work for the whole year? (1 year = 12 months)
- Fred travels 121 km a day on his delivery route. How far does he travel in 5 working days?
- Manuel buys 340 L of gas a month. In 6 months, how many litres of gas does Manuel buy?
- An apartment building has 16 apartments, each rented for \$870 a month. What is the total monthly rental income from this building?

- e. A farmer sells potatoes at \$53 per 50 kg sack. How much will he get for 75 sacks?
- f. Bob is paid \$12 per hour. If he worked 39 hours last week and 24 hours this week, how much did he earn for the two weeks? (two operations)
- g. It costs \$35 260 per working day to run the factory. How much does it cost to run this factory for a month of 23 working days?
- h. The train has an average speed of 75 km an hour. How far does this train travel in 14 hours?
- i. Lee's sports car averages 18 km per litre. How far can she drive on 12 L of gasoline?
- j. Frank bought a used car and paid for it over 15 months. He made 15 monthly payments of \$325 each. How much did he pay?

**Answers to Exercise 1**

- |             |                    |
|-------------|--------------------|
| a. \$1 812  | f. 63 hours, \$756 |
| b. 605 km   | g. \$810, 980      |
| c. 2 040 L  | h. 1 050 km        |
| d. \$13 920 | i. 216 km          |
| e. \$3 975  | j. \$4 875         |



## Topic D: Self-Test

**Mark /8 Aim 6/8**

- A. Solve these problems. Show all your work. Give yourself one mark for the correct method and one mark for the correct answer.
- A freight train has 70 cars. Each car can hold 22 680 kilograms of cargo. How much cargo can the train hold in all?
  - The highway distance between Fernie and Edmonton is 621 kilometres. How many kilometres will a bus travel in 68 trips from Fernie to Edmonton?
  - A tanker truck made 275 trips in one year. The truck hauled 23 800 litres each time. How many litres did the truck haul during the year?
  - The college cafeteria hopes to serve 425 people each day. Estimate how many meals will be served if the cafeteria is open 175 days.

### Answers to Topic D Self-Test

- A. Solve these problems. Show all your work. Give yourself one mark for the correct method and one mark for the correct answer.
- 1 587 600 kilograms
  - 42 228 kilometres
  - 6 545 500 litres
  - $400 \times 200 = 80\,000$  meals



---

## Unit 1 Review: Multiplication

You will now practice all the skills you learned in Unit 1. Check your work using the answer key at the end of the review.

A. Find the products.

$$\begin{array}{r} 81 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 441 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9342 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 73 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 512 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8132 \\ \times 3 \\ \hline \end{array}$$

B. Find the products.

$$\begin{array}{r} 48 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 892 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 2375 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 78 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 536 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 5649 \\ \times 3 \\ \hline \end{array}$$

C. Find the products.

$$\begin{array}{r} 67 \\ \times 19 \\ \hline \end{array}$$

$$\begin{array}{r} 7310 \\ \times 46 \\ \hline \end{array}$$

$$\begin{array}{r} 2735 \\ \times 846 \\ \hline \end{array}$$

$$\begin{array}{r} 581 \\ \times 34 \\ \hline \end{array}$$

$$\begin{array}{r} 754 \\ \times 692 \\ \hline \end{array}$$

$$\begin{array}{r} 857 \\ \times 308 \\ \hline \end{array}$$

$$\begin{array}{r} 629 \\ \times 407 \\ \hline \end{array}$$

$$\begin{array}{r} 2805 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 5102 \\ \times 743 \\ \hline \end{array}$$

D. Find the products. Use the shortcut.

$$\begin{array}{r} 1000 \\ \times 82 \\ \hline \end{array}$$

$$\begin{array}{r} 100 \\ \times 26 \\ \hline \end{array}$$

$$\begin{array}{r} 6263 \\ \times 1000 \\ \hline \end{array}$$

d.  $407 \times 100 =$

e.  $100 \times 9\,482 =$

f.  $3\,614 \times 10 =$

g.  $1\,000 \times 1\,795 =$

E. Find the products. Use the shortcut.

$$\begin{array}{r} 50 \\ \times 40 \\ \hline \end{array}$$

$$\begin{array}{r} 600 \\ \times 800 \\ \hline \end{array}$$

$$\begin{array}{r} 9000 \\ \times 500 \\ \hline \end{array}$$

F. Find an estimated product.

$$\begin{array}{r} 68 \\ \times 39 \\ \hline \end{array}$$

$$\begin{array}{r} 6763 \\ \times 69 \\ \hline \end{array}$$

$$\begin{array}{r} 2735 \\ \times 846 \\ \hline \end{array}$$

$$\begin{array}{r} 185 \\ \times 94 \\ \hline \end{array}$$

$$\begin{array}{r} 853 \\ \times 399 \\ \hline \end{array}$$

$$\begin{array}{r} 68924 \\ \times 268 \\ \hline \end{array}$$

## G. Word problems.

- a. The Yellow River in China is 5 464 kilometres long. How many kilometres will 75 boats cover if they travel the length of the river?
  
- b. Mount Logan in Canada is 5 959 metres high. How many metres would 24 climbers cover if they were able to climb to the top of Mt. Logan?
  
- c. How many pieces of candy are needed to pack 500 boxes, if each box has 8 rows and each row has 15 pieces of candy? (2-step question)
  
- d. The distance between Prince Rupert and Kelowna is 1 409 km. Estimate how many kilometres 42 trucks will travel if each truck makes one trip.

**Answers to Unit 1 Review**

## A. Find the products.

- |        |          |           |
|--------|----------|-----------|
| a. 405 | c. 882   | e. 18 684 |
| b. 219 | d. 2 048 | f. 24 396 |

## B. Find the products.

- |        |          |           |
|--------|----------|-----------|
| a. 336 | c. 7 136 | e. 9 500  |
| b. 702 | d. 3 216 | f. 16 947 |

## C. Find the products.

- |            |              |              |
|------------|--------------|--------------|
| a. 1 273   | d. 521 768   | g. 256 003   |
| b. 19 754  | e. 2 313 810 | h. 42 075    |
| c. 336 260 | f. 263 956   | i. 3 790 786 |

## D. Find the products. Use the shortcut.

- |              |            |              |
|--------------|------------|--------------|
| a. 82 000    | d. 40 700  | g. 1 795 000 |
| b. 2 600     | e. 948 200 |              |
| c. 6 263 000 | f. 36 140  |              |

E. Find the products. Use the shortcut.

a. 2 000

b. 480 000

c. 4 500 000

F. Find an estimated product.

a.  $70 \times 40 = 2\,800$

d.  $900 \times 400 = 360\,000$

21 000 000

b.  $200 \times 90 = 18\,000$

e.  $3\,000 \times 800 = 2\,400\,000$

c.  $7\,000 \times 70 = 490\,000$

f.  $70\,000 \times 300 =$

G. Word problems.

a. 409 800 kilometres

b. 143 016 metres or 286 032 there and back

c. 60 000 pieces of candy

d.  $1\,000 \times 40 = 40\,000$  kilometres

CONGRATULATIONS!!

Now you have finished Unit 1.

TEST TIME!

Ask your instructor for the practice test for this unit.

Once you've done the practice test, you need to do the unit 1 test. Again, ask your instructor for this.

Good luck!

## Unit 2: Division





## Topic A: Introduction and Division Facts

Division is an interesting operation. Both these signs tell you to divide:

$$8 \div 4 \quad 4 \overline{)8}$$

Division is the opposite of multiplication.

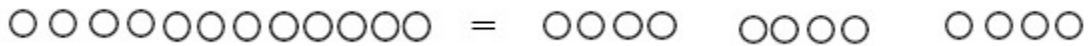
Multiplication takes equal-sized groups and puts the groups together to find the total.

$$3 \times 4 = 12$$



Division takes the total and separates that amount into equal groups. You can find the number of equal groups or the size of each group.

$$12 \div 4 = 3$$



$4 \times 3 = 12$	$12 \div 3 = 4$	$\begin{array}{r} 4 \\ 3 \overline{)12} \end{array}$
$3 \times 4 = 12$	$12 \div 4 = 3$	$\begin{array}{r} 3 \\ 4 \overline{)12} \end{array}$

### Learn this vocabulary for division:

- Dividend – The number or quantity to be divided; the amount altogether.
- Divisor – The number we divide by. The divisor tells us the number of groups or the quantity in each group that the dividend is to be separated into.
- Quotient – (“kw ō shent”) The answer to a division question.

$$\begin{array}{r} \text{quotient} \\ \text{divisor} \overline{) \text{dividend}} \end{array} \quad \text{dividend} \div \text{divisor} = \text{quotient}$$

If you have learned your times tables well, the division facts will be easier. The times table chart can be used to find division facts.

To use the times table chart for division facts:

- Find the divisor in the column on the left of the times table chart.
- Run your finger in a straight line across the divisor row until you come to the dividend.
- Go straight up that column and the quotient should be the top number.

Try a few while you are doing Exercise 1.

### Exercise 1

Complete this chart to help yourself understand the connection between multiplication and division. The first one is done for you. Check your work using the answer key at the end of the exercise.

#	Multiplication	Division	Division	“Say”
a	$5 \times 3 = 15$ $3 \times 5 = 15$	$15 \div 3 = 5$ $15 \div 5 = 3$	$\begin{array}{r} 5 \\ 3 \overline{)15} \\ \underline{3} \\ 5 \overline{)15} \end{array}$	15 divided by 3 is 5 15 divided by 5 is 3
b	$8 \times 6 = 48$ $6 \times 8 = 48$	$48 \div 6 = 8$ $48 \div 8 = 6$	$\begin{array}{r} 8 \\ 6 \overline{)48} \\ \underline{6} \\ 8 \overline{)48} \end{array}$	48 divided by 6 is 8. 48 divided by 8 is 6.
c	$3 \times 7 = 21$			
d	$5 \times 9 = 45$			
e	$4 \times 6 = 24$			
f	$2 \times 8 = 16$			
g	$7 \times 10 = 70$			

h	$6 \times 9 = 54$			
i	$9 \times 4 = 36$			
j	$6 \times 7 = 42$			

**Answers to Exercise 1**

#	Multiplication	Division	Division	“Say”
a	$5 \times 3 = 15$ $3 \times 5 = 15$	$15 \div 3 = 5$ $15 \div 5 = 3$	$\begin{array}{r} 5 \\ 3 \overline{)15} \\ \underline{15} \\ 0 \end{array}$ $\begin{array}{r} 3 \\ 5 \overline{)15} \\ \underline{15} \\ 0 \end{array}$	<p>15 divided by 3 is 5</p> <p>15 divided by 5 is 3</p>
b	$8 \times 6 = 48$ $6 \times 8 = 48$	$48 \div 6 = 8$ $48 \div 8 = 6$	$\begin{array}{r} 8 \\ 6 \overline{)48} \\ \underline{48} \\ 0 \end{array}$ $\begin{array}{r} 6 \\ 8 \overline{)48} \\ \underline{48} \\ 0 \end{array}$	<p>48 divided by 6 is 8.</p> <p>48 divided by 8 is 6.</p>
c	$3 \times 7 = 21$ $7 \times 3 = 21$	$21 \div 7 = 3$ $21 \div 3 = 7$	$\begin{array}{r} 3 \\ 7 \overline{)21} \\ \underline{21} \\ 0 \end{array}$ $\begin{array}{r} 7 \\ 3 \overline{)21} \\ \underline{21} \\ 0 \end{array}$	<p>21 divided by 7 is 3.</p> <p>21 divided by 3 is 7.</p>
d	$5 \times 9 = 45$ $9 \times 5 = 45$	$45 \div 9 = 5$ $45 \div 5 = 9$	$\begin{array}{r} 5 \\ 9 \overline{)45} \\ \underline{45} \\ 0 \end{array}$ $\begin{array}{r} 9 \\ 5 \overline{)45} \\ \underline{45} \\ 0 \end{array}$	<p>45 divided by 9 is 5.</p> <p>45 divided by 5 is 9.</p>
e	$4 \times 6 = 24$ $6 \times 4 = 24$	$24 \div 6 = 4$ $24 \div 4 = 6$	$\begin{array}{r} 4 \\ 6 \overline{)24} \\ \underline{24} \\ 0 \end{array}$ $\begin{array}{r} 6 \\ 4 \overline{)24} \\ \underline{24} \\ 0 \end{array}$	<p>24 divided by 6 is 4.</p> <p>24 divided by 4 is 6.</p>

f	$2 \times 8 = 16$ $8 \times 2 = 16$	$16 \div 8 = 2$ $16 \div 2 = 8$	$\begin{array}{r} 2 \\ 8 \overline{)16} \\ \underline{8} \\ 2 \overline{)16} \end{array}$	<p>16 divided by 8 is 2.</p> <p>16 divided by 2 is 8.</p>
g	$7 \times 10 = 70$ $10 \times 7 = 70$	$70 \div 10 = 7$ $70 \div 7 = 10$	$\begin{array}{r} 7 \\ 10 \overline{)70} \\ \underline{10} \\ 7 \overline{)70} \end{array}$	<p>70 divided by 10 is 7.</p> <p>70 divided by 7 is 10.</p>
h	$6 \times 9 = 54$ $9 \times 6 = 54$	$54 \div 9 = 6$ $54 \div 6 = 9$	$\begin{array}{r} 6 \\ 9 \overline{)54} \\ \underline{9} \\ 6 \overline{)54} \end{array}$	<p>54 divided by 9 is 6.</p> <p>54 divided by 6 is 9.</p>
i	$9 \times 4 = 36$ $4 \times 9 = 36$	$36 \div 4 = 9$ $36 \div 9 = 4$	$\begin{array}{r} 9 \\ 4 \overline{)36} \\ \underline{4} \\ 9 \overline{)36} \end{array}$	<p>36 divided by 4 is 9.</p> <p>36 divided by 9 is 4.</p>
j	$6 \times 7 = 42$ $7 \times 6 = 42$	$42 \div 7 = 6$ $42 \div 6 = 7$	$\begin{array}{r} 6 \\ 7 \overline{)42} \\ \underline{7} \\ 6 \overline{)42} \end{array}$	<p>42 divided by 7 is 6.</p> <p>42 divided by 6 is 7.</p>

## Exercise 2

Check your division facts by **quickly** doing this exercise. Check your work using the answer key at the end of the exercise.

a.  $72 \div 6 =$

h.  $50 \div 5 =$

o.  $81 \div 9 =$

b.  $12 \div 2 =$

i.  $54 \div 9 =$

p.  $88 \div 8 =$

c.  $3 \div 1 =$

j.  $8 \div 2 =$

q.  $30 \div 3 =$

d.  $80 \div 10 =$

k.  $22 \div 11 =$

r.  $12 \div 4 =$

e.  $18 \div 6 =$

l.  $45 \div 9 =$

s.  $33 \div 3 =$

f.  $40 \div 4 =$

m.  $4 \div 4 =$

t.  $66 \div 11 =$

g.  $21 \div 7 =$

n.  $24 \div 6 =$

u.  $20 \div 5 =$

**Answers to Exercise 2**

a. 12

h. 10

o. 9

b. 6

i. 6

p. 11

c. 3

j. 4

q. 10

d. 8

k. 2

r. 3

e. 3

l. 5

s. 11

f. 10

m. 1

t. 6

g. 3

n. 4

u. 4

## Exercise 3

Check your division facts by quickly doing this exercise. Check your work using the answer key at the end of the exercise.

a.  $90 \div 10 =$

g.  $84 \div 7 =$

m.  $72 \div 9 =$

b.  $70 \div 7 =$

h.  $10 \div 2 =$

n.  $20 \div 10 =$

c.  $28 \div 7 =$

i.  $64 \div 8 =$

o.  $49 \div 7 =$

d.  $32 \div 8 =$

j.  $6 \div 6 =$

p.  $48 \div 6 =$

e.  $24 \div 3 =$

k.  $60 \div 12 =$

q.  $36 \div 9 =$

f.  $36 \div 12 =$

l.  $48 \div 4 =$

r.  $21 \div 3 =$

**Answers to Exercise 3**

- |       |       |      |
|-------|-------|------|
| a. 9  | g. 12 | m. 8 |
| b. 10 | h. 5  | n. 2 |
| c. 4  | i. 8  | o. 7 |
| d. 4  | j. 1  | p. 8 |
| e. 8  | k. 5  | q. 4 |
| f. 3  | l. 12 | r. 7 |

#### Exercise 4

Check your division facts by quickly doing this exercise. Check your work using the answer key at the end of the exercise.

- |                  |                   |                   |
|------------------|-------------------|-------------------|
| a. $12 \div 6 =$ | g. $55 \div 5 =$  | m. $28 \div 4 =$  |
| b. $27 \div 9 =$ | h. $14 \div 7 =$  | n. $6 \div 1 =$   |
| c. $56 \div 7 =$ | i. $42 \div 6 =$  | o. $30 \div 5 =$  |
| d. $3 \div 1 =$  | j. $18 \div 3 =$  | p. $4 \div 2 =$   |
| e. $20 \div 2 =$ | k. $88 \div 11 =$ | q. $7 \div 7 =$   |
| f. $9 \div 3 =$  | l. $63 \div 9 =$  | r. $48 \div 12 =$ |

#### Answers to Exercise 4

- |       |       |      |
|-------|-------|------|
| a. 2  | g. 11 | m. 7 |
| b. 3  | h. 2  | n. 6 |
| c. 8  | i. 7  | o. 6 |
| d. 3  | j. 6  | p. 2 |
| e. 10 | k. 8  | q. 1 |
| f. 3  | l. 7  | r. 4 |

**Tip:** Make a list of any errors that you made and the facts that you had to really think about. If you have any more than five facts on your list, ask your instructor for suggestions on learning and drilling the division facts.

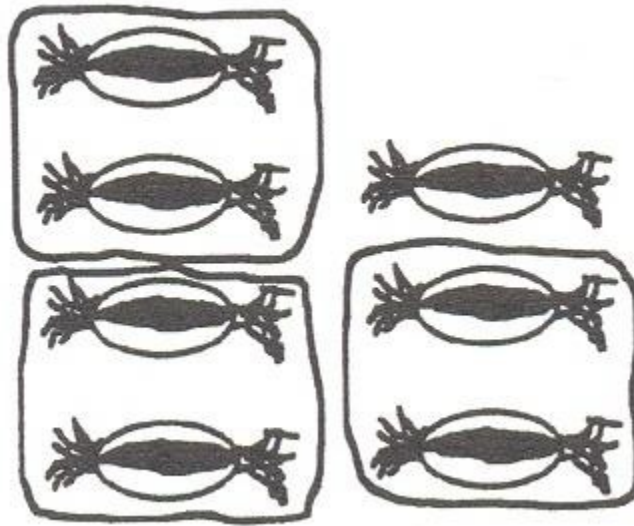


## Remainders

You have been practicing the division facts that always work out evenly – nothing is left over.

Well, in the real world things are not usually so perfect!

You have 7 candies to share among your 3 children.



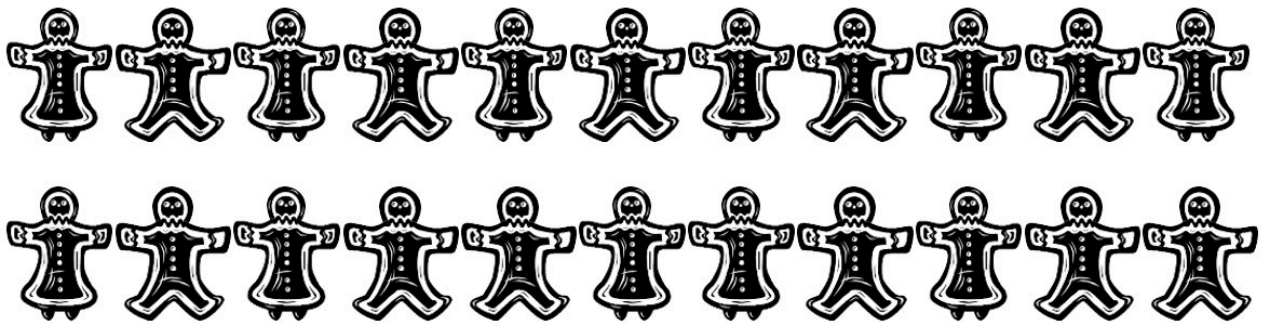
We call the left-over the remainder. For now, put R and the left over number after your quotient.

$$7 \div 3 = 2 \text{ R}1$$

$$\begin{array}{r} 2 \text{ R}1 \\ 3 \overline{)7} \end{array}$$

### Example A

Here are 22 cookies. Circle groups of 5. How many groups of 5 in 22?



You should have 4 groups with 2 left over.

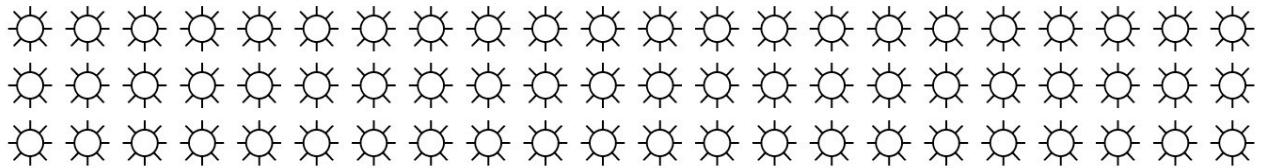
$$22 \div 5 = 4 \text{ R}2$$

$$\begin{array}{r} 4 \text{ R}2 \\ 5 \overline{)22} \end{array}$$

The remainder must not be the same size or bigger than the divisor. If it is bigger, it means another group could be made.

### Example B

Here are 66 suns. Make groups of 9. How many groups of 9 in 66?



How many groups? 7

How many left over? 3

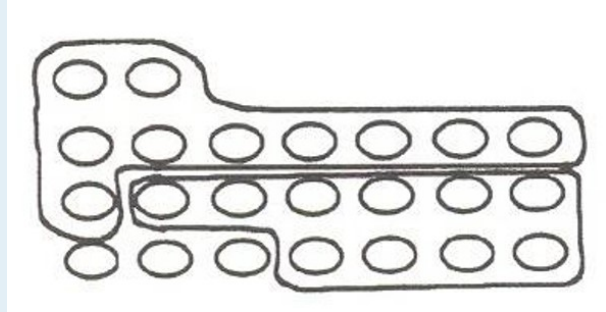
$$66 \div 9 = 7 \text{ R}3$$

$$\begin{array}{r} 7 \text{ R}3 \\ 9 \overline{)66} \end{array}$$

Tip: The remainder must **not** be the same size or bigger than the divisor. Why not? It would make another group.

### Exercise 5

Draw pictures to find the quotient and the remainder. Write each question using the other division sign as well. Have your instructor check your work.



$$\begin{array}{r} 2 \text{ R}3 \\ 10 \overline{)23} \end{array}$$

a.  $23 \div 10 = 2 \text{ R}3$

b.  $24 \div 7 =$

c.  $19 \div 3 =$

d.  $39 \div 12 =$

You cannot always draw pictures, so how should you find the quotients?

### Example C

$$29 \div 3 =$$

Use multiplication tables or the division facts to find a trial quotient. What can you multiply by 3 to find a number close to 29?

- $3 \times 9 = 27$
- $3 \times 10 = 30$

Use 9 as the trial quotient. Do not use 10 because  $3 \times 10 = 30$ , which is more than the dividend 29.

1. Divide.

$$\begin{array}{r} 9 \\ 3 \overline{)29} \end{array}$$

2. Multiply.  $9 \times 3 = 27$ . Write the product under the 29.

$$\begin{array}{r} 9 \\ 3 \overline{)29} \\ 27 \end{array}$$

3. Subtract 27 from 29 to find the remainder.

$$\begin{array}{r} 9 \\ 3 \overline{)29} \\ -27 \\ \hline 2 \end{array}$$

4. Check (compare) to be sure the remainder is less than (<) the divisor.  
 $2 < 3$

$$29 \div 3 = 9 \text{ R}2$$

#### Example D

$$60 \div 7 =$$

Think what can be multiplied by 7 to find a number close to 60.

- $7 \times 8 = 56$  (good)
- $7 \times 9 = 63$  (too big)

Use 8 as the trial quotient.

1. Divide.

$$\begin{array}{r} 8 \\ 7 \overline{)60} \end{array}$$

2. Multiply.

$$\begin{array}{r} 8 \\ 7 \overline{)60} \\ 56 \end{array}$$

3. Subtract.

$$\begin{array}{r} 8 \\ 7 \overline{)60} \\ -56 \\ \hline 4 \end{array}$$

4. Compare to be sure the remainder is less than the divisor.  
 $4 < 7$

$$60 \div 7 = 8 \text{ R}4$$

### Exercise 6

Find the quotients and remainders (divide, multiply, subtract, compare). Check your work using the answer key at the end of the exercise.

a.  $5 \overline{)28}$

g.  $8 \overline{)75}$

m.  $3 \overline{)26}$

b.  $4 \overline{)15}$

h.  $3 \overline{)19}$

n.  $8 \overline{)47}$

c.  $6 \overline{)47}$

i.  $7 \overline{)32}$

o.  $9 \overline{)46}$

d.  $9 \overline{)37}$

j.  $4 \overline{)9}$

p.  $6 \overline{)43}$

e.  $2 \overline{)13}$

k.  $9 \overline{)55}$

q.  $5 \overline{)49}$

f.  $6 \overline{)25}$

l.  $10 \overline{)98}$

r.  $4 \overline{)38}$

s.  $2\overline{)19}$

u.  $3\overline{)23}$

w.  $9\overline{)67}$

t.  $7\overline{)61}$

v.  $8\overline{)78}$

x.  $6\overline{)45}$

**Answers to Exercise 6**

a. 5 R3

i. 4 R4

q. 9 R4

b. 3 R3

j. 2 R1

r. 9 R2

c. 7 R5

k. 6 R1

s. 9 R1

d. 4 R1

l. 9 R8

t. 8 R5

e. 6 R1

m. 8 R2

u. 7 R2

f. 4 R1

n. 5 R7

v. 9 R6

g. 9 R3

o. 5 R1

w. 7 R4

h. 6 R1

p. 7 R1

x. 7 R3

**Exercise 7**

Find the quotients and remainders (divide, multiply, subtract, compare.) Check your work using the answer key at the end of the exercise.

**Example**

$59 \div 7 =$

Rewrite:  $7\overline{)59}$

$$\begin{array}{r} 8 \\ 7\overline{)59} \\ \underline{-56} \\ 3 \end{array}$$

Then solve:

Answer: 8 R3

a.  $27 \div 5 =$

b.  $13 \div 2 =$

c.  $46 \div 9 =$

d.  $38 \div 6 =$

k.  $67 \div 9 =$

r.  $77 \div 8 =$

e.  $61 \div 7 =$

l.  $52 \div 6 =$

s.  $20 \div 3 =$

f.  $14 \div 5 =$

m.  $45 \div 8 =$

t.  $11 \div 2 =$

g.  $49 \div 8 =$

n.  $25 \div 7 =$

u.  $23 \div 5 =$

h.  $28 \div 3 =$

o.  $11 \div 3 =$

v.  $54 \div 7 =$

i.  $78 \div 8 =$

p.  $53 \div 9 =$

w.  $87 \div 9 =$

j.  $37 \div 4 =$

q.  $19 \div 4 =$

x.  $9 \div 4 =$

**Answers for Exercise 7**

a. 5 R2

i. 9 R6

q. 4 R3

b. 6 R1

j. 9 R1

r. 9 R5

c. 5 R1

k. 7 R4

s. 6 R2

d. 6 R2

l. 8 R4

t. 5 R1

e. 8 R5

m. 5 R5

u. 4 R3

f. 2 R4

n. 3 R4

v. 7 R5

g. 6 R1

o. 3 R2

w. 9 R6

h. 9 R1

p. 5 R8

x. 2 R1

**Topic A: Self-Test****Mark /12      Aim 9/12**

A. Give the answer. (6 marks)

a.  $63 \div 9 =$

c.  $72 \div 8 =$

e.  $86 \div 4 =$

b.  $21 \div 7 =$

d.  $65 \div 4 =$

f.  $75 \div 6 =$

B. Find the quotient. (6 marks)

a.  $6 \overline{)59}$

c.  $7 \overline{)51}$

e.  $5 \overline{)49}$

b.  $9 \overline{)87}$

d.  $8 \overline{)76}$

f.  $3 \overline{)26}$

**Answers to Topic A Self-Test**

A. Give the answer.

a. 7

c. 9

e. 8

b. 3

d. 9

f. 8

B. Find the quotient.

a. 9 R5

c. 7 R2

e. 9 R4

b. 9 R6

d. 9 R4

f. 8 R2



## Topic B: Divisibility

Divisibility is when two numbers can be divided without a remainder.

For example, 18 is divisible by 3 because  $18 \div 3 = 6$ .

18 is not divisible by 5 because  $18 \div 5 = 3$  with a remainder of 3.

### Divisibility by 2

A number is divisible by 2 if it ends in 0, 2, 4, 6 or 8.

#### Example A

438, 540, 256, 12, and 154 are all divisible by 2 because each number ends in a 0, 2, 4, 6, or 8.

#### Example B

351, 945, 849, 347, and 193 are not divisible by 2 because each number does not end in a 0, 2, 4, 6 or 8.

#### Exercise 1

Circle the numbers that are divisible by 2. Check your work using the answer key at the end of the exercise.

- |       |        |          |
|-------|--------|----------|
| a. 22 | e. 274 | i. 2 437 |
| b. 35 | f. 345 | j. 7 548 |
| c. 17 | g. 639 | k. 6 754 |
| d. 10 | h. 456 | l. 5 543 |

#### Answers to Exercise 1

The following numbers are divisible by 2: a, d, e, h, j, k.

## Divisibility by 3

A number is divisible by 3 if the sum (total) of the digits is divisible by 3.

### Example C

63

$$6 + 3 = 9$$

9 is divisible by three, so 63 is divisible by three.

### Example D

148

$$1 + 4 + 8 = 13$$

13 is not divisible by three, so 148 is not divisible by 3.

### Example E

5 892

$$5 + 8 + 9 + 2 = 24$$

Add again:  $2 + 4 = 6$

6 is divisible by 3, so 5 892 is divisible by 3.

## Exercise 2

Circle the numbers that are divisible by 3. Check your work using the answer key at the end of the exercise.

- |       |        |          |
|-------|--------|----------|
| a. 27 | e. 274 | i. 3 175 |
| b. 35 | f. 581 | j. 1 458 |
| c. 81 | g. 564 | k. 1 890 |
| d. 94 | h. 316 | l. 3 934 |

**Answers to Exercise 2**

The following numbers are divisible by 3: a, c, g, j, k.

## Divisibility by 5

A number is divisible by 5 if the number ends in 0 or 5.

## Example F

290 is divisible by 5 because it ends in 0.

## Example G

132 is not divisible by 5 because it does not end in 0 or 5.

## Exercise 3

Circle the numbers that are divisible by 5. Check your work using the answer key at the end of the exercise.

- |       |       |       |
|-------|-------|-------|
| a. 45 | b. 84 | c. 72 |
|-------|-------|-------|

d. 90

g. 672

j. 6 375

e. 800

h. 355

k. 7 020

f. 753

i. 6 009

l. 1 704

**Answers to Exercise 3**

The following numbers are divisible by 5: a, d, e, h, j, k.

## Exercise 4

For each number, identify if it is divisible by 2, 3, and 5. Check your work using the answer key at the end of the exercise.

Number	Divisible by 2	Divisible by 3	Divisible by 5
474	Yes	Yes	No
615			
412			
865			
300			
831			
525			
350			
710			
429			
906			
634			
430			
275			

**Answers to Exercise 4**

Number	Divisible by 2	Divisible by 3	Divisible by 5
474	Yes	Yes	No
615	No	Yes	Yes
412	Yes	No	No
865	No	No	Yes
300	Yes	Yes	Yes
831	No	Yes	No
525	No	Yes	Yes
350	Yes	No	Yes
710	Yes	No	Yes
429	No	Yes	No
906	Yes	Yes	No
634	Yes	No	No
430	Yes	No	Yes
275	No	No	Yes

### Exercise 5

For each number, identify if it is divisible by 2, 3, and 5. Check your work using the answer key at the end of the exercise.

Number	Divisible by 2	Divisible by 3	Divisible by 5
3 585			
7 548			
5 890			
6 318			
3 905			
5 280			
1 760			
8 007			
6 752			
7 375			
5 523			
2 625			
8 956			
9 150			

**Answers to Exercise 5**

Number	Divisible by 2	Divisible by 3	Divisible by 5
3 585	No	Yes	Yes
7 548	Yes	Yes	No
5 890	Yes	No	Yes
6 318	Yes	Yes	No
3 905	No	No	Yes
5 280	Yes	Yes	Yes
1 760	Yes	No	Yes
8 007	No	Yes	No
6 752	Yes	No	No
7 375	No	No	Yes
5 523	No	Yes	No
2 625	No	Yes	Yes
8 956	Yes	No	No
9 150	Yes	Yes	Yes

## Divisibility by 9

A number is divisible by 9 if the sum (total) of the digits is divisible by 9.

Example H

135

$$1 + 3 + 5 = 9$$

9 is divisible by 9, so 135 is divisible by 9.

## Example I

7 578

$$7 + 5 + 7 + 8 = 27$$

27 is divisible by 9, so 7 578 is divisible by 9.

## Example J

57 896

$$5 + 7 + 8 + 9 + 6 = 35$$

35 is not divisible by 9, so 57 896 is not divisible by 9.

## Exercise 6

Circle the numbers that are divisible by 9. Check your work using the answer key at the end of the exercise.

- |        |          |           |
|--------|----------|-----------|
| a. 538 | e. 6 213 | i. 34 937 |
| b. 783 | f. 5 742 | j. 39 402 |
| c. 954 | g. 7 083 | k. 74 124 |
| d. 762 | h. 5 738 | l. 45 683 |

**Answers to Exercise 6**

The following numbers are divisible by 9: b, c, f, g, j, k

## Exercise 7

For each number, identify if it is divisible by 2, 3, 5, and 9. Check your work using the answer key at the end of the exercise.



Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
453				
320				
216				
726				
712				
425				
630				
375				
990				
210				

### Answers to Exercise 7

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
453	No	Yes	No	No
320	Yes	No	Yes	No
216	Yes	Yes	No	Yes
726	Yes	Yes	No	No
712	Yes	No	No	No
425	No	No	Yes	No
630	Yes	Yes	Yes	Yes
375	No	Yes	Yes	No
990	Yes	Yes	Yes	Yes
210	Yes	Yes	Yes	No

### Exercise 8

For each number, identify if it is divisible by 2, 3, 5, and 9. Check your work using the answer key at the end of the exercise.

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
837				
360				
648				
981				
465				
1 002				
3 520				
6 435				
8 022				
7 425				

**Answers to Exercise 8**

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
837	No	Yes	No	Yes
360	Yes	Yes	Yes	Yes
648	Yes	Yes	No	Yes
981	No	Yes	No	Yes
465	No	Yes	Yes	No
1 002	Yes	Yes	No	No
3 520	Yes	No	Yes	No
6 435	No	Yes	Yes	Yes
8 022	Yes	Yes	No	No
7 425	No	Yes	Yes	Yes

**Exercise 9**

For each number, identify if it is divisible by 2, 3, 5, and 9. Check your work using the answer key at the end of the exercise

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
1 200				
7 164				
3 681				
8 205				
2 745				
4 320				
7 350				
4 000				
1 368				
6 720				

### Answers to Exercise 9

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
1 200	Yes	Yes	Yes	No
7 164	Yes	Yes	No	Yes
3 681	No	Yes	No	Yes
8 205	No	Yes	Yes	No
2 745	No	Yes	Yes	Yes
4 320	Yes	Yes	Yes	Yes
7 350	Yes	Yes	Yes	No
4 000	Yes	No	Yes	No
1 368	Yes	Yes	No	Yes
6 720	Yes	Yes	Yes	No

## Topic B: Self-Test

**Mark /12      Aim 9/12**

A. From the list of numbers, write the numbers that are divisible by the specified number.  
48, 925, 1 467, 2 645, 5 534, 7 512, 31 183, 52 361

a. Which numbers are divisible by 2?

b. Which numbers are divisible by 3?

c. Which numbers are divisible by 5?

d. Which numbers are divisible by 9?

B. For each number, identify if it is divisible by 2, 3, 5, and 9.

Number	Divisible by 2	Divisible by 3	Divisible by 5	Divisible by 9
1 200				
7 164				
3 681				
8 205				
2 745				

### Answers to Topic B Self-Test

A. From the list of numbers, write the numbers that are divisible by the specified number.

a. 48, 7 512, 5 534

b. 48, 1 467, 7 512

c. 925, 2 645

d. 1 467

B. For each number, identify if it is divisible by 2, 3, 5, and 9.

<b>Number</b>	<b>Divisible by 2</b>	<b>Divisible by 3</b>	<b>Divisible by 5</b>	<b>Divisible by 9</b>
1 200	Yes	Yes	Yes	No
7 164	Yes	Yes	No	Yes
3 681	No	Yes	No	Yes
8 205	No	Yes	Yes	No
2 745	No	Yes	Yes	Yes



## Topic C: Dividing Larger Numbers by One-Digit Divisors

Several methods are used to divide larger numbers. This book will only teach one method. If you have learned a different method for dividing, ask your instructor to review it with you. You can use the practice exercises in this workbook using whichever method you prefer.

### One-Digit Divisors without Remainders

Division has four steps which are repeated until the dividend is completely divided. Work through the three examples which show these steps.

1. Divide.
2. Multiply
3. Subtract and compare the remainder to the divisor.
4. Bring down the next digit in the dividend and repeat.

#### Example A

$$294 \div 7 =$$

$$\text{Rewrite as } 7 \overline{)294}$$

#### Step 1: Divide.

- a. Find a trial quotient using multiplication tables or division facts.
- b. Look at the dividend one digit at a time.
  - i. The first digit is a 2, which is really 2 hundreds.
  - ii. Will 7 go into 2? Can you divide 2 by 7? No.
  - iii. Look at the first 2 digits, 29, which is really 29 tens.
  - iv. Will 7 go into 29? Yes.  $4 \times 7 = 28$ .
- c. The first number in the quotient is 4. Place the 4 in the quotient directly above the 9 tens. The 4 is 4 tens in the quotient.

$$\begin{array}{r} 4 \\ 7 \overline{)294} \end{array}$$

#### Step 2: Multiply.

- Multiply  $4 \times 7 = 28$ .
- Write the 28 under the 29. Draw a line.

$$\begin{array}{r} 4 \\ 7 \overline{)294} \\ \underline{28} \end{array}$$

**Step 3: Subtract.**

- Subtract  $29 - 28 = 1$  (ten).
- Check  $1 < 7$ .

$$\begin{array}{r} 4 \\ 7 \overline{)294} \\ \underline{-28} \\ 1 \end{array}$$

**Step 4: Bring down the next number in the dividend.**

- Bring down the next number in the dividend (4), and put it beside the result of the subtraction you just completed (1).
- Together, they make 14. This 14 is the number that you must now divide.

$$\begin{array}{r} 4 \\ 7 \overline{)294} \\ \underline{-28} \\ 14 \end{array}$$

**Repeat Step 1: Divide.**

- Divide  $14 \div 7 = 2$
- Put the 2 in the quotient right after the 4 in the ones place.

$$\begin{array}{r} 42 \\ 7 \overline{)294} \\ \underline{-28} \\ 14 \end{array}$$

**Repeat Step 2: Multiply.**

- Multiply  $2 \times 7 = 14$ .
- Write the 14 under the 14. Draw a line.



$$\begin{array}{r}
 42 \\
 7 \overline{)294} \\
 \underline{-28} \phantom{0} \\
 14 \\
 \underline{14} \\
 0
 \end{array}$$

**Repeat Step 3: Subtract.**

- Subtract  $14 - 14 = 0$ . There is 0 remainder.
- Check  $0 < 7$ .

$$\begin{array}{r}
 42 \\
 7 \overline{)294} \\
 \underline{-28} \phantom{0} \\
 14 \\
 \underline{-14} \\
 0
 \end{array}$$

**There are no more numbers in the dividend to bring down, so you are done.**

$$294 \div 7 = 42$$

Example B

$$128 \div 2 =$$

$$\begin{array}{r}
 64 \\
 2 \overline{)128} \\
 \underline{-12} \phantom{0} \\
 08 \\
 \underline{-8} \\
 0
 \end{array}$$

**Step 1: Divide.**

- Can 2 go into 1? No.
- Can 2 go into 12? Yes.

c. How many times?

$$\circ \quad 2 \times 6 = 12; 12 \div 2 = 6$$

d. The first number in the trial quotient is 6. Put the 6 in the quotient directly above the 2 tens dividend.

**Step 2: Multiply.**

a.  $6 \times 2 = 12$ .

b. Write the 12 under the 12. Draw a line.

**Step 3: Subtract.**

a.  $12 - 12 = 0$

b. Check  $0 < 12$

**Step 4: Bring down the next number in the dividend.**

a. Bring down the next number in the dividend (8), and put it beside the result of the subtraction you just completed (0).

b. 8 is now the number to be divided.

**Repeat**

1. Divide:  $8 \div 2 = 4$

2. Multiple:  $4 \times 2 = 8$

3. Subtract:  $8 - 8 = 0$

a. Check  $0 < 2$

4. Bring down the next digit. There are no more digits in the dividend.

$$128 \div 2 = 64$$

Exercise 1

Find the quotients (divide, multiply, subtract, compare). Check your work using the answer key at the end of the exercise.

a.  $4 \overline{)364}$

b.  $2 \overline{)144}$

c.  $5 \overline{)455}$

d.  $7 \overline{)651}$

k.  $6 \overline{)366}$

r.  $8 \overline{)248}$

e.  $8 \overline{)144}$

l.  $4 \overline{)244}$

s.  $8 \overline{)312}$

f.  $2 \overline{)166}$

m.  $5 \overline{)375}$

t.  $7 \overline{)462}$

g.  $7 \overline{)588}$

n.  $8 \overline{)200}$

u.  $5 \overline{)295}$

h.  $2 \overline{)196}$

o.  $2 \overline{)628}$

v.  $6 \overline{)384}$

i.  $5 \overline{)230}$

p.  $7 \overline{)357}$

w.  $2 \overline{)276}$

j.  $8 \overline{)584}$

q.  $9 \overline{)837}$

x.  $4 \overline{)372}$

**Answers to Exercise 1**

a. 91

d. 93

g. 84

b. 72

e. 18

h. 98

c. 91

f. 83

i. 46

j. 73

o. 314

t. 66

k. 61

p. 51

u. 59

l. 61

q. 93

v. 64

m. 75

r. 31

w. 138

n. 25

s. 39

x. 93

## Example C

$856 \div 8 =$

$$8 \overline{)856}$$

**Divide**

Does 8 go into 8? Yes.  $8 \div 8 = 1$ .

$$\begin{array}{r} 1 \\ 8 \overline{)856} \end{array}$$

**Multiply**

$1 \times 8 = 8$

$$\begin{array}{r} 1 \\ 8 \overline{)856} \\ 8 \end{array}$$

**Subtract**

$8 - 8 = 0$ . Check  $0 < 8$ .

$$\begin{array}{r} 1 \\ 8 \overline{)856} \\ -8 \\ \hline 0 \end{array}$$

**Bring down the next digit**

5 is now the number to be divided.

$$\begin{array}{r} 1 \\ 8 \overline{)856} \\ -8 \\ \hline 05 \end{array}$$

Now repeat.

**Divide**

Does 8 go into 5? No.

You must put a zero to hold the place in the quotient. If a digit is brought down, a digit must be placed in the quotient.

**Multiply**

$$0 \times 8 = 0$$

$$\begin{array}{r} 10 \\ 8 \overline{)856} \\ -8 \\ \hline 05 \end{array}$$

**Subtract**

$$5 - 0 = 5. \text{ Check } 5 < 8.$$

$$\begin{array}{r} 10 \\ 8 \overline{)856} \\ -8 \\ \hline 05 \\ -0 \\ \hline 5 \end{array}$$

**Bring down the next digit**

56 is now the number to be divided.

$$\begin{array}{r}
 10 \\
 8 \overline{)856} \\
 \underline{-8} \phantom{0} \\
 05 \\
 \underline{-0} \\
 56
 \end{array}$$

Now repeat.

**Divide**

Does 8 go into 56? Yes.  $56 \div 8 = 7$ .

Write 7 in the quotient in the ones place above the 6 in the dividend.

$$\begin{array}{r}
 107 \\
 8 \overline{)856} \\
 \underline{-8} \phantom{0} \\
 05 \\
 \underline{-0} \\
 56
 \end{array}$$

**Multiply**

$$7 \times 8 = 56$$

$$\begin{array}{r}
 107 \\
 8 \overline{)856} \\
 \underline{-8} \phantom{0} \\
 05 \\
 \underline{-0} \\
 56 \\
 56
 \end{array}$$

**Subtract**

$$56 - 56 = 0. \text{ Check } 0 < 8.$$

$$\begin{array}{r}
 107 \\
 8 \overline{)856} \\
 \underline{-8} \phantom{0} \\
 05 \\
 \underline{-0} \\
 56 \\
 \underline{-56} \\
 0
 \end{array}$$

**Bring down the next digit.**

No more digits.

$$856 \div 8 = 107$$

## Exercise 2

Find the quotients (divide, multiply, subtract, compare). Check your work using the answer key at the end of the exercise.

a.  $7 \overline{)721}$

e.  $4 \overline{)824}$

i.  $5 \overline{)540}$

b.  $9 \overline{)954}$

f.  $9 \overline{)972}$

j.  $6 \overline{)654}$

c.  $3 \overline{)927}$

g.  $7 \overline{)714}$

k.  $8 \overline{)832}$

d.  $3 \overline{)621}$

h.  $2 \overline{)416}$

l.  $4 \overline{)436}$

m.  $5 \overline{)515}$

q.  $5 \overline{)525}$

u.  $8 \overline{)872}$

n.  $2 \overline{)814}$

r.  $7 \overline{)763}$

v.  $4 \overline{)416}$

o.  $6 \overline{)648}$

s.  $9 \overline{)945}$

w.  $6 \overline{)618}$

p.  $8 \overline{)856}$

t.  $3 \overline{)315}$

x.  $2 \overline{)612}$

**Answers to Exercise 2**

a. 103

i. 108

q. 105

b. 106

j. 109

r. 109

c. 309

k. 104

s. 105

d. 207

l. 109

t. 105

e. 206

m. 103

u. 109

f. 108

n. 407

v. 104

g. 102

o. 108

w. 103

h. 208

p. 107

x. 306

**One-Digit Divisors with Remainders**

Do the division exactly the same way that you have been learning. Often there is a remainder after the last subtraction. Write it with the quotient as you already know how to do.



## Example D

$259 \div 8 =$

$$\begin{array}{r}
 32 \text{ R}3 \\
 8 \overline{)259} \\
 \underline{-24} \phantom{0} \\
 19 \\
 \underline{-16} \\
 3
 \end{array}$$

$259 \div 8 = 32 \text{ R}3$

## Exercise 3

Divide and show any remainders. Check your work using the answer key at the end of the exercise.

a.  $20 \overline{)93}$

e.  $4 \overline{)95}$

i.  $9 \overline{)98}$

b.  $3 \overline{)52}$

f.  $9 \overline{)96}$

j.  $4 \overline{)59}$

c.  $5 \overline{)94}$

g.  $6 \overline{)97}$

k.  $6 \overline{)76}$

d.  $7 \overline{)74}$

h.  $8 \overline{)99}$

l.  $3 \overline{)79}$

m.  $7\overline{)96}$

q.  $7\overline{)89}$

u.  $4\overline{)71}$

n.  $5\overline{)57}$

r.  $6\overline{)82}$

v.  $3\overline{)65}$

o.  $2\overline{)47}$

s.  $5\overline{)67}$

w.  $9\overline{)92}$

p.  $8\overline{)91}$

t.  $2\overline{)85}$

x.  $8\overline{)94}$

**Answers to Exercise 3**

a. 46 R1

i. 10 R8

q. 12 R5

b. 17 R1

j. 14 R3

r. 13 R4

c. 18 R4

k. 12 R4

s. 13 R2

d. 10 R4

l. 26 R1

t. 42 R1

e. 23 R3

m. 13 R5

u. 17 R3

f. 10 R6

n. 11 R2

v. 21 R2

g. 16 R1

o. 23 R1

w. 10 R2

h. 12 R3

p. 11 R3

x. 11 R6

**Check Division by Multiplying**

To check your division, do this:

1. Multiply the quotient by the divisor.
2. Add on any remainder.

The product will equal the dividend if your arithmetic is correct.

## Example E

$$\begin{array}{r}
 52 \text{ R}1 \\
 9 \overline{)469} \\
 \underline{-45} \phantom{0} \\
 19 \\
 \underline{-18} \\
 1
 \end{array}$$

$$\begin{array}{r}
 52 \\
 \times 9 \\
 \hline
 468
 \end{array}$$

$$468 + 1 = 469$$

## Exercise 4

Divide and check your answer by multiplying. Check your work using the answer key at the end of the exercise.

a.  $7 \overline{)709}$

e.  $9 \overline{)406}$

i.  $3 \overline{)962}$

b.  $2 \overline{)423}$

f.  $6 \overline{)125}$

j.  $4 \overline{)805}$

c.  $5 \overline{)538}$

g.  $3 \overline{)605}$

k.  $8 \overline{)301}$

d.  $4 \overline{)609}$

h.  $9 \overline{)928}$

l.  $2 \overline{)807}$

m.  $6\overline{)725}$

q.  $2\overline{)197}$

u.  $7\overline{)876}$

n.  $7\overline{)320}$

r.  $6\overline{)307}$

v.  $4\overline{)101}$

o.  $9\overline{)140}$

s.  $5\overline{)504}$

w.  $3\overline{)269}$

p.  $8\overline{)483}$

t.  $8\overline{)709}$

x.  $5\overline{)473}$

**Answers to Exercise 4**

a. 101 R2

i. 320 R2

q. 98 R1

b. 211 R1

j. 201 R1

r. 51 R1

c. 107 R3

k. 37 R5

s. 100 R4

d. 152 R1

l. 403 R1

t. 88 R5

e. 45 R1

m. 120 R5

u. 125 R1

f. 20 R5

n. 45 R5

v. 25 R1

g. 201 R2

o. 15 R5

w. 89 R2

h. 103 R1

p. 60 R3

x. 94 R3

## Topic C: Self-Test

Mark /24 Aim 19/24

A. Find the quotient. (6 marks)

a.  $6\overline{)96}$

c.  $7\overline{)91}$

e.  $5\overline{)94}$

b.  $4\overline{)92}$

d.  $2\overline{)93}$

f.  $3\overline{)52}$

B. Divide. (6 marks)

a.  $7\overline{)182}$

c.  $6\overline{)162}$

e.  $4\overline{)184}$

b.  $8\overline{)736}$

d.  $5\overline{)295}$

f.  $9\overline{)576}$

C. Divide and show your check for each answer (12 marks – 1 mark for question, 1 mark for check).

a.  $9\overline{)705}$

c.  $7\overline{)899}$

e.  $8\overline{)876}$

b.  $4\overline{)257}$

d.  $5\overline{)538}$

f.  $6\overline{)628}$

### Answers to Topic C Self-Test

A. Find the quotient.

a. 16

c. 13

e. 18 R4

b. 23

d. 46 R1

f. 17 R1

B. Divide.

a. 26

c. 27

e. 46

b. 92

d. 59

f. 64

C. Divide and show your check for each answer.

a. 78 R3

c. 128 R3

e. 109 R4

b. 64 R1

d. 107 R3

f. 104 R4

## Topic D: Dividing by Two and Three Digit Divisors

### Finding Trial Quotients:

When dividing by 2-digit numbers, you will need to estimate the quotient. This guess is called a trial quotient.

#### Example A

$$624 \div 24$$

Rewrite as  $24 \overline{)624}$

#### Step 1: Divide

- a. Think:  $2 \overline{)6}$  is 3. So  $24 \overline{)62}$  is about 3.

#### Step 2: Multiply and subtract.

$$\begin{array}{r} 3 \\ a. \quad 24 \overline{)624} \\ \underline{72} \end{array}$$

- b. Since  $72 > 62$ , 3 is too large.

#### Step 3: Try a smaller number, multiply and subtract.

$$\begin{array}{r} 2 \\ a. \quad 24 \overline{)624} \\ \underline{48} \\ 14 \end{array}$$

- b. Since  $4 < 24$ , 2 is correct.

#### Step 4: Finish the problem.

## Example B

$$630 \div 15$$

Rewrite as  $15 \overline{)630}$

**Step 1: Divide**

- a. 15 rounds to 20. Think:  $2 \overline{)6}$  is 3. So  $15 \overline{)63}$  is about 3.

**Step 2: Multiply and subtract.**

$$\begin{array}{r} 3 \\ 15 \overline{)630} \\ \underline{45} \\ 18 \end{array}$$

- b. Since  $18 > 15$ , 3 is too small.

**Step 3: Try a larger number, multiply and subtract.**

$$\begin{array}{r} 4 \\ 24 \overline{)630} \\ \underline{60} \\ 3 \end{array}$$

- b. Since  $3 < 15$ , 4 is correct.

**Step 4: Finish the problem.**

## Exercise 1

In each question, the trial quotient is either too large or too small. Multiply. Write too large or too small on the line. Then, write the correct trial quotient beside. Check your work using the answer key at the end of the exercise.

a.  $\begin{array}{r} 2 \\ 25 \overline{)475} \end{array}$

b.  $\begin{array}{r} 3 \\ 15 \overline{)682} \end{array}$

c.  $\begin{array}{r} 5 \\ 18 \overline{)813} \end{array}$



$$\text{d. } \begin{array}{r} 2 \\ 25 \overline{)810} \end{array}$$

$$\text{j. } \begin{array}{r} 4 \\ 34 \overline{)176} \end{array}$$

$$\text{p. } \begin{array}{r} 3 \\ 23 \overline{)943} \end{array}$$

$$\text{e. } \begin{array}{r} 3 \\ 33 \overline{)891} \end{array}$$

$$\text{k. } \begin{array}{r} 4 \\ 12 \overline{)420} \end{array}$$

$$\text{q. } \begin{array}{r} 3 \\ 24 \overline{)578} \end{array}$$

$$\text{f. } \begin{array}{r} 3 \\ 18 \overline{)819} \end{array}$$

$$\text{l. } \begin{array}{r} 2 \\ 43 \overline{)801} \end{array}$$

$$\text{r. } \begin{array}{r} 2 \\ 29 \overline{)406} \end{array}$$

$$\text{g. } \begin{array}{r} 3 \\ 27 \overline{)727} \end{array}$$

$$\text{m. } \begin{array}{r} 3 \\ 31 \overline{)899} \end{array}$$

$$\text{s. } \begin{array}{r} 2 \\ 48 \overline{)892} \end{array}$$

$$\text{h. } \begin{array}{r} 2 \\ 35 \overline{)652} \end{array}$$

$$\text{n. } \begin{array}{r} 4 \\ 18 \overline{)648} \end{array}$$

$$\text{t. } \begin{array}{r} 2 \\ 28 \overline{)534} \end{array}$$

$$\text{i. } \begin{array}{r} 3 \\ 25 \overline{)650} \end{array}$$

$$\text{o. } \begin{array}{r} 4 \\ 27 \overline{)946} \end{array}$$

$$\text{u. } \begin{array}{r} 3 \\ 37 \overline{)939} \end{array}$$

$$\begin{array}{r} \phantom{v.} \phantom{2} \\ 28 \overline{)854} \end{array}$$

**Answers to Exercise 1**

- |                 |                 |                 |
|-----------------|-----------------|-----------------|
| a. too large, 1 | i. too large, 2 | q. too large, 2 |
| b. too small, 4 | j. too small, 5 | r. too large, 1 |
| c. too large, 4 | k. too large, 3 | s. too large, 1 |
| d. too small, 3 | l. too large, 1 | t. too large 1  |
| e. too large, 2 | m. too. large 2 | u. too large, 2 |
| f. too small, 4 | n. too large, 3 | v. too small, 3 |
| g. too large, 2 | o. too large, 3 |                 |
| h. too large 1  | p. too small, 4 |                 |

## Example C

$$78 \overline{)2706}$$

Since 78 rounds to 80, think  $8 \overline{)27}$ . 8 goes into  $27 \approx 3$ . 3 would be a good trial quotient.

$$\begin{array}{r} \phantom{3} \\ 78 \overline{)2706} \\ \underline{234} \\ 36 \end{array}$$

Since  $36 < 78$ , 3 is a good trial quotient.

## Example D

$$27 \overline{)2205}$$

Since 27 rounds to 30, think  $3 \overline{)22}$ . 3 goes into  $22 \approx 7$ . 7 would be a good trial quotient.

$$\begin{array}{r} 7 \\ 27 \overline{)2205} \\ \underline{189} \\ 31 \end{array}$$

Since  $31 > 27$ , so 7 is too small. A better trial quotient would be 8.

### Exercise 2

Find the first digit in the trial quotient. Check your work using the answer key at the end of the exercise.

$$\begin{array}{r} 4 \\ 43 \overline{)1772} \\ \underline{16} \\ 1 \end{array} \quad \begin{array}{r} 4 \\ 4 \overline{)17} \\ \underline{16} \\ 1 \end{array} \quad .1 < 4$$

$$e. 59 \overline{)4164}$$

$$j. 35 \overline{)3316}$$

$$b. 64 \overline{)3276}$$

$$f. 75 \overline{)2420}$$

$$k. 83 \overline{)7237}$$

$$c. 28 \overline{)6008}$$

$$g. 54 \overline{)3316}$$

$$l. 77 \overline{)6763}$$

$$d. 33 \overline{)2731}$$

$$h. 38 \overline{)2759}$$

$$m. 93 \overline{)3724}$$

$$i. 46 \overline{)387}$$

$$n. 52 \overline{)4690}$$

o.  $86 \overline{)2089}$

s.  $32 \overline{)7840}$

w.  $38 \overline{)2158}$

p.  $26 \overline{)1417}$

t.  $24 \overline{)7605}$

x.  $42 \overline{)1491}$

q.  $72 \overline{)1462}$

u.  $16 \overline{)8640}$

r.  $27 \overline{)6939}$

v.  $45 \overline{)3060}$

**Answers to Exercise 2**

a. 4

i. 8

q. 2

b. 5

j. 4

r. 2

c. 2

k. 8

s. 2

d. 8

l. 8

t. 3

e. 7

m. 4

u. 5

f. 3

n. 9

v. 6

g. 6

o. 2

w. 5

h. 7

p. 5

x. 3

## Two Digit Divisors

Dividing by large divisors is a challenge!

You must **estimate** how many times one number will divide into another. Use pencil and have an eraser close by when you do these questions. You will use the same steps that you already know.

### Example E

$$964 \div 75 =$$

#### Step 1: Divide

1. Does 75 go into 9? **NO**
2. Does 75 go into 96? **YES**
3. Estimate
  1. Round 75 to 80 – think “8”
  2. Round 96 to 100 – think “10”
  3. How many 8’s in 10? ( $8 \cdot 1 = 8$ ,  $10 \cdot 8 = 80$ )
  4. The estimate for the first digit in the trial quotient is 1.
4. Write **1** in the quotient above the 6 tens.

$$\begin{array}{r} 1 \\ 75 \overline{)964} \end{array}$$

#### Step 2: Multiply

$$1 \times 75 = 75$$

1. Write 75 under 96.

$$\begin{array}{r} 1 \\ 75 \overline{)964} \\ \underline{75} \end{array}$$

#### Step 3: Subtract

$$96 - 75 = 21$$

1. Check  $21 < 75$ ? **YES!**

$$\begin{array}{r} 1 \\ 75 \overline{)964} \\ \underline{75} \\ 21 \end{array}$$

**Step 4: Bring down the next digit** in the dividend. 214 is now the number to be divided.

$$\begin{array}{r} 1 \\ 75 \overline{)964} \\ \underline{75 \downarrow} \\ 214 \end{array}$$

### REPEAT

#### Step 1: Divide

1. Does 75 go into 214? **YES**
2. Estimate 75 as 80 – think “8”
  1. Estimate 214 as 200 – think “20”
  2. 8 goes into 20 2 times (  $8 \times 2 = 16$ , so  $20 \div 8 \approx 2$  )
3. The estimate for the second digit in the trial quotient is 2. Write 2 in the quotient above the 4 in the dividend.

$$\begin{array}{r} 12 \\ 75 \overline{)964} \\ \underline{75 \downarrow} \\ 214 \end{array}$$

#### Step 2: Multiply

$$2 \times 75 = 150$$

1. Write 150 under the 214.

$$\begin{array}{r} 12 \\ 75 \overline{)964} \\ \underline{75 \downarrow} \\ 214 \\ \underline{150} \end{array}$$

**Step 3: Subtract and check** that the remainder is less than the divisor.

$$\begin{array}{r} 12 \\ 75 \overline{)964} \\ \underline{75 \downarrow} \\ 214 \\ \underline{150} \\ 64 \end{array}$$

**Step 4: Bring down** – no more digits in dividend.

To check your answer

$$\begin{array}{r} 75 \\ \times 12 \\ \hline 150 \\ 750 \\ \hline 900 \\ + 64 \\ \hline 964 \end{array}$$

### Exercise 3

Carefully divide these questions. Be careful to keep the hundreds in line with the hundreds, the tens with the tens, and so on. You might want to use squared paper for long division. Check your work using the answer key at the end of the exercise.

If you are having **any** difficulty, ask your instructor to watch you doing a few questions to be sure you are using a correct method.

a.  $10 \overline{)720}$

c.  $21 \overline{)882}$

e.  $32 \overline{)1632}$

b.  $12 \overline{)564}$

d.  $22 \overline{)946}$

f.  $23 \overline{)943}$

g.  $62 \overline{)2528}$

k.  $18 \overline{)6250}$

o.  $58 \overline{)6500}$

h.  $71 \overline{)2414}$

l.  $25 \overline{)1550}$

p.  $24 \overline{)9648}$

i.  $24 \overline{)7578}$

m.  $19 \overline{)9595}$

q.  $49 \overline{)1312}$

j.  $82 \overline{)2958}$

n.  $47 \overline{)3854}$

r.  $67 \overline{)7683}$

**Answers to Exercise 3**

a. 72

g. 40 R48

m. 505

b. 47

h. 34

n. 82

c. 42

i. 24 R2

o. 112 R4

d. 43

j. 36 R6

p. 402

e. 51

k. 347 R4

q. 26 R38

f. 41

l. 62

r. 114 R45

**If the estimate for your trial quotient is too large the result of the multiplication will be larger than the numbers in the dividend.**

1. **Divide:** Trial estimate is 4.

2. **Multiply:**

1.  $4 \times 23 = 92$

2. 92 is larger than 78, so 4 is too large an estimate. Erase it. Try 3.  $3 \times 23 = 69$

3. 3 is the correct estimate and you can complete the division.



1.	$23 \overline{)784}$
2.	$\begin{array}{r} 4 \\ 23 \overline{)784} \\ \underline{92} \end{array}$
3.	$\begin{array}{r} 34 \text{ R}2 \\ 23 \overline{)784} \\ \underline{69 \downarrow} \\ 94 \\ \underline{92} \\ 2 \end{array}$

**If the estimate is too small, the result of the subtraction will be larger than the divisor.**

1. **Divide:** Trial estimate is 5.
2. **Multiply:**  $5 \times 72 = 360$
3. **Subtract:**
  1.  $448 - 72 = 360$
  2. Check  $88 < 72$ ? **NO**, 88 is greater than 72.
  3. So 5 is too small. Erase it and use a larger number. 6 will be a better estimate.
4. **Divide:**  $448 \div 82 \approx 6$
5. **Multiply:**  $6 \times 72 = 432$
6. **Subtract:**
  1.  $448 - 432 = 16$
  2. Check  $16 < 72$ ? **YES!**
7. **Bring down the next digit** and complete the division.

1.	$72 \overline{)4487}$
2.	$\begin{array}{r} 5 \\ 72 \overline{)4487} \\ \underline{360} \\ 88 \end{array}$
3.	$\begin{array}{r} 62 \text{ R}23 \\ 72 \overline{)4487} \\ \underline{432} \downarrow \\ 167 \\ \underline{144} \\ 23 \end{array}$

## Exercise 4

Divide and check your work by multiplying. Check your work using the answer key at the end of the exercise.

a.  $18 \overline{)648}$

d.  $84 \overline{)8640}$

g.  $20 \overline{)4060}$

b.  $26 \overline{)6766}$

e.  $72 \overline{)2883}$

h.  $47 \overline{)1728}$

c.  $52 \overline{)1968}$

f.  $94 \overline{)8126}$

i.  $33 \overline{)1886}$

j.  $25 \overline{)5750}$

l.  $42 \overline{)8442}$

n.  $96 \overline{)20160}$

k.  $79 \overline{)2765}$

m.  $57 \overline{)9144}$

o.  $\frac{23550}{95}$

**Answers to Exercise 4**

a. 36

f. 86 R42

k. 35

b. 260 R6

g. 203

l. 201

c. 37 R44

h. 36 R36

m. 160 R24

d. 102 R72

i. 57 R5

n. 210

e. 40 R3

j. 230

o. 314

p.

**Dividing by 10, 100, 1000...****What is the pattern? When you divide by 10**

1. The ones digit in the dividend becomes the remainder.

$$10 \overline{)324} = 32R4$$

2. The other numbers in the dividend stay the same but each digit is one place value less.
  - – the hundreds become tens
  - – the tens become ones
  - – the ones become the remainder

**Exercise 5**

Find the quotients. Look for the pattern. Check your work using the answer key at the end of the exercise.

a.  $10\overline{)46}$

d.  $10\overline{)832}$

g.  $10\overline{)2457}$

b.  $10\overline{)75}$

e.  $10\overline{)674}$

h.  $10\overline{)3685}$

c.  $10\overline{)136}$

f.  $10\overline{)952}$

**Answers to Exercise 5**

a. 4 R6

d. 83 R2

g. 245 R7

b. 7 R5

e. 67 R4

h. 368 R5

c. 13 R6

f. 95 R2

**When you divide by 100**

- The ones and tens digits in the dividend become the remainder.
- The other digits in the dividend stay the same but each digit is **two** places less.
  - the thousands become tens
  - the hundreds become ones
  - the tens and ones become the remainder

**Exercise 6**

Find these quotients. Look for the pattern when you divide. Check your work using the answer key at the end of the exercise

a.  $100\overline{)386}$

b.  $100\overline{)995}$

c.  $100\overline{)269}$

d.  $100 \overline{)175}$

f.  $100 \overline{)4671}$

h.  $100 \overline{)43821}$

e.  $100 \overline{)2948}$

g.  $100 \overline{)92045}$

**Answers to Exercise 6**

a. 3 R86

d. 1 R75

g. 920 R45

b. 9 R95

e. 29 R48

h. 438 R21

c. 2 R69

f. 46 R71

**When you divide by 1000**

1. The ones, tens, and hundreds digits become the remainder.
2. The other digits stay the same but are **three** place values less.
  - thousands become ones
  - ten thousands become tens
  - hundred thousands become hundreds

## Exercise 7

Try these. Check your work using the answer key at the end of the exercise.

a.  $1000 \overline{)2398}$

c.  $1000 \overline{)4835}$

e.  $1000 \overline{)82405}$

b.  $1000 \overline{)6475}$

d.  $1000 \overline{)63291}$

f.  $1000 \overline{)293591}$

**Answers to Exercise 7**

a. 2 R398

b. 6 R475

c. 4 R835

d. 63 R291

e. 82 R405

f. 293 R591

## Three Digit Divisors

If the divisor has three digits, use the method you know for two-digit divisors, but estimate the divisor to the nearest hundred to find the trial quotient. Be very **careful** to put the first digit in the quotient in the correct place.

### Example F

$$17\,902 \div 381 =$$

#### Step 1: Divide

1. Does 381 go into 1? NO
2. Does 381 go into 17? NO
3. Does 381 go into 179? NO
4. Does 381 go into 1 790? YES
5. Estimate 381 as 400. Think 4.
6. Estimate 1 790 as 1 800. Think 18.
7. 4 goes into 18  $\approx$  4 times ( $4 \times 4 = 16$ )
8. Your estimate is 4. Write 4 in the quotient above the 0 in the dividend.

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \end{array}$$

#### Step 2: Multiply

1.  $4 \times 381 = 1\,524$

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \\ \underline{1524} \end{array}$$

#### Step 3: Subtract

1.  $1\,790 - 1\,524 = 266$
2. Check  $266 < 381$ ? YES!

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \\ \underline{1524} \\ 266 \end{array}$$

**Step 4: Bring down** the 2. 2 662 is now the number to be divided

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \\ \underline{1524} \downarrow \\ 2662 \end{array}$$

**REPEAT**

**Step 1: Divide**  $2662 \div 381 =$

1. Estimate 381 as 400. Think of 4.
2. Estimate 2 662 as 2 700. Think 27.
3. 4 goes into 27  $\approx$  6 times ( $4 \times 6 = 24$ ).
4. Place this estimate in the quotient above the 2

$$\begin{array}{r} 4 \\ 381 \overline{)17902} \\ \underline{1524} \downarrow \\ 2662 \end{array}$$

**Step 2: Multiply**

1.  $6 \times 381 = 2\,286$

$$\begin{array}{r} 46 \\ 381 \overline{)17902} \\ \underline{1524} \downarrow \\ 2662 \\ \underline{2286} \end{array}$$

**Step 3: Subtract**

1.  $2\,662 - 2\,286 = 376$
2. Check  $376 < 381$ ? YES!

$$\begin{array}{r}
 46 \\
 381 \overline{)17902} \\
 \underline{1524} \downarrow \\
 2662 \\
 \underline{2286} \\
 376
 \end{array}$$

**Step 4: No more digits to bring down.**

$$17\,902 \div 381 = 46 \text{ R}376$$

### Exercise 8

Divide and check your answers. These questions are hard work! Check your work using the answer key at the end of the exercise.

a.  $115 \overline{)8682}$

c.  $325 \overline{)66321}$

e.  $860 \overline{)262412}$

b.  $205 \overline{)2384}$

d.  $241 \overline{)13284}$

f.  $659 \overline{)270190}$

### Answers to Exercise 8

a. 75 R57

c. 204 R21

e. 305 R112

b. 11 R129

d. 55 R29

f. 410



**Topic D: Self-Test****Mark /12 Aim 10/12**A. Divide and check your work for questions **b** and **f** using multiplication. (12 marks)

a.  $185 \div 10 =$

e.  $67 \overline{)5963}$

i.  $606 \overline{)26094}$

b.  $4 \overline{)92}$

f.  $53 \overline{)4856}$

j.  $1000 \overline{)83652}$

c.  $408 \div 50 =$

g.  $91 \overline{)8736}$

d.  $72 \overline{)6768}$

h.  $265 \overline{)133624}$

**Answers to Topic D Self-Test**A. Divide and check your work for questions **b** and **f** using multiplication.

a. 18 R5

e. 89

i. 43 R36

b. 8 R8

f. 91 R33

j. 83 R652

c. 38

g. 96

d. 94

h. 504 R64



## Topic E: Estimating Quotients

### Divide Numbers That Both End With Zeros

In Unit 1 you learned a shortcut for multiplying numbers that end with zeros.

Now you will learn a short way to divide numbers that **both** end with zeros. First do this exercise and notice the pattern in the quotients.

#### Exercise 1

Divide. Check your work using the answer key at the end of the exercise.

a.  $2\overline{)6}$

e.  $5\overline{)25}$

i.  $14\overline{)28}$

b.  $20\overline{)60}$

f.  $50\overline{)250}$

j.  $140\overline{)280}$

c.  $200\overline{)600}$

g.  $500\overline{)2500}$

k.  $1400\overline{)2800}$

d.  $2000\overline{)6000}$

h.  $5000\overline{)25000}$

l.  $14000\overline{)28000}$

#### Answers to Exercise 1

a. 3

d. 3

g. 5

b. 3

e. 5

h. 5

c. 3

f. 5

i. 2

j. 2

k. 2

l. 2

**Here is the shortcut:**

When dividing numbers that both end with zeros, cross off the **same number** of **zeros** from the end of the divisor and the dividend. This is sometimes called **cancelling zeros**.

## Example A

$$4800 \div 60 = 480\cancel{0} \div 6\cancel{0}$$

$$\begin{array}{r} 80 \\ 6 \overline{)480} \end{array}$$

## Example B

$$23000 \div 500 = 230\cancel{00} \div 5\cancel{00}$$

$$\begin{array}{r} 46 \\ 5 \overline{)230} \\ \underline{20} \phantom{0} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

## Example C

$$2\cancel{000} \overline{)680\cancel{000}}$$

$$\begin{array}{r}
 340 \\
 2 \overline{)680} \\
 \underline{6 \downarrow} \\
 08 \\
 \underline{8 \downarrow} \\
 00 \\
 \underline{0} \\
 0
 \end{array}$$

If you are interested in the facts of arithmetic that make this shortcut work, ask your instructor for an explanation.

### Exercise 2

Quickly find the quotients. Remember to cancel the **same number** of zeros in both the divisor and dividend in each question. Check your work using the answer key at the end of the exercise.

a.  $30 \overline{)90}$

d.  $400 \overline{)20000}$

g.  $60000 \overline{)2400000}$

b.  $40 \overline{)1600}$

e.  $500 \overline{)35000}$

h.  $800000 \overline{)400000000}$

c.  $300 \overline{)1200}$

f.  $700 \overline{)42000}$

### Answers to Exercise 2

a. 3

d. 50

g. 40

b. 40

e. 70

h. 500

c. 4

f. 60

## Rounding Division Questions to Estimate

**We round numbers and estimate to get a quick answer.**

In division, round the divisor and dividend **before** you divide.

1. If the divisor only has one digit, do not round it,
2. Round the dividend to make the arithmetic easier for yourself.

### Example D

Look at the two ways of rounding this question.

$$1796 \div 32 =$$

The divisor (32) will round to 30. This dividend (1796) can be rounded to 1800 or to 2000. Let's try each:

Round to 1800.

$$\begin{array}{r} 60 \\ 30 \overline{)1800} \end{array}$$

Round to 2000.

$$\begin{array}{r} 66 \text{ R}2 \\ 30 \overline{)2000} \\ \underline{18} \phantom{0} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

Rounding 1796 to 1800 is easier arithmetic because  $18 \div 3$  works out evenly, so  $180 \div 3$  works out evenly. Both estimates are correct.

### Example E

$$2688 \div 28 =$$

1. Round the divisor (28) to 30.

2. Round the dividend (2688) to 2700 or to 3000.

Round to 2700	$\begin{array}{r} 90 \\ 3\cancel{0} \overline{)270\cancel{0}} \end{array}$
Round to 3000	$\begin{array}{r} 100 \\ 3\cancel{0} \overline{)300\cancel{0}} \end{array}$

Both estimates are correct and both are easy to do.

### Example F

$$2\,893 \div 47 =$$

1. Round the divisor (47) to 50.
2. Round the dividend (2 893) to 2 900 or 3 000.
3. Which rounded dividend will be easier to divide by 50?

1. Answer: The 3000 because 5 goes evenly into 30.

$$\begin{array}{r} 60 \\ 5\cancel{0} \overline{)300\cancel{0}} \end{array}$$

### Exercise 3

Give an estimated quotient. Show your rounding. Check your work using the answer key at the end of the exercise.

a.  $365 \overline{)27692}$

b.  $23 \overline{)34459}$

c.  $45 \overline{)4590}$

d.  $16 \overline{)6729}$

g.  $81 \overline{)4049}$

j.  $200 \overline{)20000}$

e.  $56 \overline{)4792}$

h.  $68 \overline{)5636}$

k.  $557 \overline{)41680}$

f.  $75 \overline{)7648}$

i.  $19 \overline{)1672}$

**Answers to Exercise 3**

a.  $28\,000 \div 400 = 70$

e.  $4\,800 \div 60 = 80$

i.  $2\,000 \div 20 = 100$

b.  $34\,000 \div 20 = 1700$

f.  $8\,000 \div 80 = 100$

j.  $20\,000 \div 200 = 100$

c.  $5\,000 \div 50 = 100$

g.  $4\,000 \div 80 = 50$

k.  $42\,000 \div 600 = 70$

d.  $7\,000 \div 20 = 350$

h.  $5\,600 \div 70 = 80$



**Topic E: Self-Test****Mark /6 Aim 5/6**

A. Give an estimated quotient. Show your work. (6 marks)

a.  $98 \overline{)8541}$

c.  $241 \overline{)26348}$

e.  $24 \overline{)1776}$

b.  $27 \overline{)2963}$

d.  $55 \overline{)3276}$

f.  $59 \overline{)11830}$



**Answers to Topic E Self-Test**

A. Give an estimated quotient. Show your work.

a.  $8\,500 \div 100 = 85$

c.  $26\,000 \div 200 = 130$

e.  $2\,000 \div 20 = 100$

b.  $3\,000 \div 30 = 100$

d.  $3\,000 \div 60 = 50$

f.  $12\,000 \div 60 = 200$



## Topic F: Division Problems

Review [Topic F: Problem Solving](#) in *Adult Literacy Fundamentals Mathematics: Book Two*.

One common type of division problem gives a total amount for **several** things and asks you to **find** what the amount would be for **one**.

Problems may tell you...	and ask you to find...
kilometres driven in 8 hours (h)	km driven in 1 h
cost for 15 kg (or litres, etc.)	cost for one kg
pay for 40 hours	pay for one hour
rent for one year (12 months)	rent for one month
work done in eight hours	work done in one hour
kilometres driven on 55 L of gas	km driven on 1 L of gas

The word *per* is a Latin word meaning “for each”. For example, “Find the kilometres *per* hour” may be used to mean, “Find the kilometres driven in one hour.” A slash (/) also means per e.g. km/h.

**“Find the average”** is another way of asking you to find the amount for one.

It may be difficult to decide which number is the dividend and which is the divisor. These suggestions should help:

- Look at the question in the problem. What do you have to find out? Look for the words “per” and “for one.”
- How will the answer be written? That is your clue. If the answer is km/h then the division equation will be total km  $\div$  h. Study these examples:
  - total of kilometres  $\div$  number of hours =  $km/h$
  - total of kilometres  $\div$  number of litres =  $km/L$
  - total cost  $\div$  unit = cost per unit
  - total pay  $\div$  hours (or days, etc.) = pay per hour
  - total rent  $\div$  number of months = rent/month
  - total things done  $\div$  total time = number done/unit of time
- Do a quick estimate.
- Look at your estimate and re-read the problem. Does your answer make sense?

To **find the average**, divide the total amount by the number of items that make up the total. You may first have to add the different items together to find the total.

$$\text{Average} = \frac{\text{Total amount}}{\text{number of items that make the total}}$$

#### Example A

You bowled 5 games with scores of 124, 187, 164, 205, 130. What was your average score?

1. Find the total by adding  $124 + 187 + 164 + 205 + 130 = 810$
2. Divide the total by number of items  $810 \div 5 \text{ games} = 162 \text{ per game}$

#### Example B

Joan and Rick have been keeping track of their household costs. They want to plan a monthly budget. Their grocery bills for six months were \$428, \$605, \$397, \$530, \$590, and \$474. What is their average monthly grocery cost?

1. Find the total amount.

$$\$428 + \$605 + \$397 + \$530 + \$590 + \$474 = \$3\,024$$

2. Divide total amount by number of items.

$$\$3\,024 \div 6 = \$504 \text{ average cost per month}$$

Some details to remember:

- 1 minute = 60 seconds
- 1 hour = 60 minutes
- 1 year = 365 days
- 1 year = 12 months
- 1 year = 52 weeks

Key words that point to division:

- |                          |                       |
|--------------------------|-----------------------|
| • Find the average       | • Split               |
| • Separated              | • Find the unit price |
| • Find the ____ per ____ | • Shared              |

## Exercise 1

Solve these problems. Use the five problem solving steps. Be sure to write down an estimate and check that the estimate makes sense **before** you find the actual solution. Check your work using the answer key at the end of the exercise.

- a. A machine shop can stamp out 360 car parts in an 8 hour working How many parts is that per hour?
- b. Izyan paid \$560 for 4 tires. How much did each tire cost?
- c. Bjork earned \$8 840 in 4
  - i. How much did he earn each month?
  - ii. How much did he earn per week? (4 months is 17 weeks)
- d. Theron used 9 L of gasoline to drive 207 km. How many kilometres did he drive per litre?
- e. The total cost of the car Elena bought is \$14 880 including taxes and interest. She will pay for it in 24 equal payments. How much will each payment be?
- f. Diego worked 8 hours a day for five days and earned \$360. How much was he paid per hour? (This is a 2 step problem – you must first find the total number of)
- g. a) Dae-Hyun and Mi-Ok can afford no more than a total of \$14 940 per year for rent, electricity, and phone. How much can they pay per month?

**Answers to Exercise 1**

- |                      |                      |
|----------------------|----------------------|
| a. 45 parts per hour | c. 23 km/L           |
| b. \$140 per tire    | d. \$620 per payment |
| i. \$2210 per month  | e. \$9 per hour      |
| ii. \$520 per week   | f. \$1245 per month  |

A second type of division problem gives the total amount and the size of each group. You will find the number of groups. You will notice that **both numbers have the same units**. The **answer** to the problem **will give another unit**. This other unit will be asked for in the problem.

## Example C

One necklace uses **125 beads**. How many necklaces can Susan make for the craft fair if she has **6 250 beads**?

Find how many groups of 125 there are in 6 520.

$$6\ 250 \div 125 =$$

$$\begin{array}{r} 50 \\ 125 \overline{)6250} \\ \underline{625} \\ 0 \end{array}$$

She can make **50 necklaces**.

#### Example D

If you drive an average speed of 80 km an hour, how many hours will it take you to drive 560 km?

Find how many groups of 80 km there are in 560 km.

$$560 \div 80 = 7$$

The 560 km trip will take 7 hours.

#### Exercise 2

Pay attention to wording and situations as you solve these problems. Use the five problem solving steps. Be sure to write down an estimate and check that the estimate makes sense **before** you find the actual solution. Check your work using the answer key at the end of the exercise.

- A train travels 90 km per hour. How many hours will it take the train to go 540 km?
- A car gets 16 km per litre of gasoline. How many litres will the car need to go 128 km?
- About 8 m is needed for one parking space. How many parking spaces can be made along a street that is 232 m long?
- If you spend an average of 8 minutes on one math problem, how many problems can you finish in one hour? Will you have any time left? How much?
- The Skating Club members decided to sell home-made candy to raise money. The boxes they bought will hold 45 pieces of candy. If everyone makes a double batch of fudge they will have 2 590 pieces of How many boxes can they fill? How many pieces of fudge are left-over for them to eat?
- A class of 334 students is going to Victoria by bus. Each bus holds 43 passengers. How many buses do they need? Will there be any empty seats? (Be careful with this one!)

#### Answers to Exercise 2



- |                      |                                  |
|----------------------|----------------------------------|
| a. 6 hours           | d. 7 problems, yes, 4 min        |
| b. 8 L               | e. 57 boxes, 25 pieces left over |
| c. 29 parking spaces | f. 8 buses, 10 empty seats       |

## Unit Pricing

A unit price is the price for one of something. To find unit price, divide the total cost by the number of things bought.

### Example E

5 shirts cost \$60

To find the cost per shirt,  $\$60 \div 5 =$

$$\begin{array}{r} 12 \\ 5 \overline{)60} \end{array}$$

The unit price is \$12.

### Example F

6 L of oil for \$18

To find the cost per L,  $\$18 \div 6 =$

$$\begin{array}{r} 3 \\ 6 \overline{)18} \end{array}$$

The unit price is \$3.

## Exercise 3

Solve the cost per unit price. Check your work using the answer key at the end of the exercise.

- |                               |                                       |
|-------------------------------|---------------------------------------|
| a. 2 CDs for \$26             | h. 4 boxes of chocolate bars for \$48 |
| b. 3 cans of dog food for \$6 | i. 2 WD-40 for \$6                    |
| c. 4 air fresheners for \$8   | j. 3 paint rollers for \$9            |
| d. 2 cat treats for \$4       | k. 4 tie downs for \$20               |
| e. 2 pizzas for \$22          | l. 3 boxes of diapers for \$51        |
| f. 2 cans of peanuts for \$8  | m. 3 work shirts for \$45             |
| g. 2 ice cream for \$12       | n. 8 pairs of socks for \$64          |

**Answers to Exercise 3**

- |         |         |
|---------|---------|
| a. \$13 | h. \$12 |
| b. \$2  | i. \$3  |
| c. \$2  | j. \$3  |
| d. \$2  | k. \$5  |
| e. \$11 | l. \$17 |
| f. \$4  | m. \$15 |
| g. \$6  | n. \$8  |

**Best Buy**

The **best buy** is the **lowest unit price**.

## Example G

You can buy 4 L of canola oil for \$8 or 10 L of canola oil for \$30. Which is the best buy?

$$\$8 \div 4 = \text{can be rewritten and solved: } \begin{array}{r} 2 \\ 4 \overline{)8} \end{array}$$

$$\$30 \div 10 = \text{can be rewritten and solved: } \begin{array}{r} 3 \\ 10 \overline{)30} \end{array}$$

4 L of canola oil for \$8 is a better buy since the unit price is \$2 per L, while 10 L for \$30 has a unit price of \$3 per L.

#### Exercise 4

Solve the unit price and then underline the best buy. Check your work using the answer key at the end of the exercise.

- a. 2 L of engine oil for \$8 or 5 L of engine oil for \$15
- b. 4 tires for \$240 or 2 tires for \$110
- c. 6 jars of salad dressing for \$24 or 3 jars of salad dressing for \$15
- d. 7 kg of dog food for \$21 or 16 kg of dog food for \$32
- e. 3 DVDs for \$54 or 7 DVDs for \$119
- f. 3 L of laundry soap for \$6 or 17 L of laundry soap for \$68

#### Answers to Exercise 4

- a. \$4, \$3, 5 L for \$15 is the best buy.
- b. \$60, \$55, 2 tires for \$110 is the best buy.
- c. \$4, \$5, 6 salad dressing for \$24 is the best buy.
- d. \$3, \$2, 16 kg for \$32 is the best buy.
- e. \$18, \$17, 7 DVDs for \$119 is the best buy.
- f. \$2, \$4, 3 L for \$6 is the best buy.

## Topic F: Self Test

Mark /12 Aim 10/12

- A. Solve these problems. (12 marks) **2 marks each – 1 for correct method, 1 for correct solution.**
- Enrique drove the 1 920 km from Dease Lake to Creston in 24 hours. What was his average speed in kilometres per hour?
  - The Evergreen Company employs 26 people. Its total payroll for last month was \$84 162. What was the average monthly pay cheque per person?
  - The proud gardener grew a total crop of 135 cucumbers on 15 plants. What was the average crop per plant?
  - In a recent truckload sale, electric stoves were sold for \$432. The gross income from the stove sale was \$42 336. How many stoves were sold?
  - The 39 farmers in Jones Valley had a total income last year of \$2 905 500. What was their average income?
  - A store has an inventory (stock on hand) of chairs with a total value of \$1 738. Each chair is to be sold at \$79. How many of these chairs are there?

### Answers to Topic E Self-Test

- A. Give an estimated quotient. Show your work.
- |                          |              |
|--------------------------|--------------|
| a. 80 km/h               | d. 98 stoves |
| b. \$3 237 per month     | e. \$74 500  |
| c. 9 cucumbers per plant | f. 22 chairs |

## Topic G: Mixed Problems

Carefully read again the **Problem Solving Steps** in [Adult Literacy Fundamentals Mathematics: Book Two](#), Topic F or ask your instructor for a copy of those pages. Read the problems to help you *get a feel* for the wording and problem situations you can expect for addition, subtraction, multiplication, and division problems. Ask your instructor for a list of key words that will point to the operation you should choose.

### Exercise 1

Solve these problems using the five problem solving steps. Show your estimation and actual work. Write a sentence answer remembering to use the **units**. Check your work using the answer key at the end of the exercise.

- a. Saika gave her students cinnamon hearts on Valentine’s Day. She bought a box of 1 120 cinnamon hearts and gave each student 35 candies, using up the whole box. How many students does she have?
- b. Each stamp cost 57 cents. Dolores bought 100 stamps. How much money did she spend on stamps (before taxes)?
- c. Etienne planted 30 tomato plants in rows of 5 plants. How many rows did he plant?
- d. There are 8 servings per large economy-size can of fruit. The restaurant ordered 5 cases with 24 cans per case. How many servings of fruit can the restaurant get from this order? (This is a two step problem – first find the total number of cans. Then find the number of servings.)
- e. A train traveled 2 250 km at a speed of 75 km per hour. How many hours did the trip take?
- f. The regular mountain bike costs \$499 and the fancy model is \$675. How much more do you pay for the fancy mountain bike?
- g. The members of the Shiny Wheels Bicycle Club ride at an average speed of 16 km/h. On their weekend trip they rode 2 hours Friday night, 7 hours on Saturday, spent two hours soaking their aching bones at the Hot Springs, and then rode a final five hours on Sunday. How many kilometres did they ride on this weekend trip? (2 steps)
- h. Last week Mrs. Sanderson drove 29 km on Monday, 42 km on Tuesday, 5 km on Wednesday, and 21 km on Friday. How far did she drive last week?

### Answers to Exercise 1

- |                 |               |
|-----------------|---------------|
| a. 32 students  | e. 30 hours   |
| b. \$57.00      | f. \$176 more |
| c. 6 rows       | g. 224 km     |
| d. 960 servings | h. 97 km      |



## Unit 2 Review: Division

You will now practice all the skills you learned in Unit 2. Check your work using the answer key at the end of the review.

A. Complete this chart

	Multiplication	Division	Division	“Say”
a)	$5 \times 3 = 15$ $3 \times 5 = 15$	$15 \div 3 = 5$ $15 \div 5 = 3$	$\begin{array}{r} 5 \\ 3 \overline{)15} \\ \underline{3} \\ 5 \overline{)15} \end{array}$	“15 divided by 3 is 5.” “15 divided by 5 is 3.”
b)	$3 \times 6 = 18$			
c)	$3 \times 7 = 21$			
d)	$5 \times 9 = 45$			

B. Give the answer.

a.  $56 \div 7 =$

b.  $40 \div 8 =$

c.  $54 \div 9 =$

d.  $6 \overline{)42}$

e.  $9 \overline{)72}$

f.  $8 \overline{)32}$

C. Find the quotients.

a.  $7 \overline{)68}$

c.  $5 \overline{)24}$

b.  $4 \overline{)29}$

d.  $6 \overline{)53}$

D. For each number, identify if it is divisible by 2, 3, 5, and 9.

#	Number	2	3	5	9
a)	135				
b)	384				
c)	4 614				
d)	495				
e)	648				
f)	745				

E. Find the quotients.

a.  $8 \overline{)296}$

c.  $4 \overline{)732}$

b.  $6 \overline{)252}$

d.  $5 \overline{)175}$

F. Find the quotients.

a.  $3 \overline{)86}$

c.  $2 \overline{)71}$

b.  $4 \overline{)97}$

d.  $5 \overline{)59}$

G. Find the quotients.

a.  $7 \overline{)615}$

c.  $3 \overline{)781}$

b.  $2 \overline{)647}$

d.  $9 \overline{)839}$

H. Find the quotients.

a.  $8956 \div 42 =$

e.  $41082 \div 334 =$

b.  $32 \overline{)832}$

f.  $781 \overline{)39752}$

c.  $69140 \div 56 =$

g.  $275 \overline{)55661}$

d.  $312 \overline{)9984}$

h.  $307 \overline{)91838}$

I. Find the quotients.



a.  $1000 \overline{)38645}$

c.  $4923 \div 10 =$

b.  $18592 \div 100 =$

d.  $100 \overline{)17342}$

**J. Quickly find the quotients. Remember to cancel the same number of zeros in both the divisor and dividend in each question.**

a.  $200 \overline{)50000}$

c.  $40000 \overline{)1600000}$

b.  $6000 \overline{)360000}$

d.  $70000 \overline{)6300000}$

**K. Give an estimated quotient. Show your rounding.**

a.  $37 \overline{)15725}$

c.  $768 \overline{)63721}$

b.  $54 \overline{)8478}$

d.  $6267 \overline{)536497}$

**L. Word Problems**

- At the Kaizen Factory, 14 325 cars were put together in 5 days. Each day the same number of cars were built. How many cars were built each day?
- The Blaster Rubber Company needs to make 6 912 hockey pucks. Mr. Frost, the foreman, says that their machines can make the pucks in 12 hours. How many pucks would be made in one hour?
- The distance between Fort St. John and Kimberley is 1 092 km. What was your average speed if the trip took 12 hours?
- The new stadium has 15 981 seats divided evenly into 76 sections. Estimate how many seats are in each section?

**M. Solve the cost per unit price.**

a. 4 rolls of hockey tape for \$8

b. 4 cans of butane fuel for \$12

**N. Solve the unit price and then underline the best buy.**

a. 2 L of antifreeze for \$6 or 5 L of antifreeze for \$10

b. 8 kilograms of bird seed for \$16 or 4 kilograms of bird seed for \$12

**O. Word Problems.**

- The bakery uses 43 kilograms of butter in each batch of shortbread cookies. How many batches of shortbread can be made from 3 569 kilograms of butter?
- Each crate that the men unloaded weighed 175 kilograms. If they unloaded 232 crates, how many kilograms did they unload?
- The parts factory produced 4 173 less parts this month than last month. The factory produced 49 736 parts this month. How many parts did the factory produce last month?
- Three Eastjet jets were flown 24 826 kilometres, 9 423 kilometres and 56 015

kilometres. What is the total kilometres the three jets were flown?

### Answers to Unit 2 Review

A. Complete this chart

#	Multiplication	Division	Division	“Say”
a)	$5 \times 3 = 15$ $3 \times 5 = 15$	$15 \div 3 = 5$ $15 \div 5 = 3$	$\begin{array}{r} 5 \\ 3 \overline{)15} \\ \underline{3} \\ 5 \overline{)15} \end{array}$	15 divided by 3 is 5. 15 divided by 5 is 3.
b)	$3 \times 6 = 18$ $6 \times 3 = 18$	$18 \div 6 = 3$ $18 \div 3 = 6$	$\begin{array}{r} 3 \\ 6 \overline{)18} \\ \underline{6} \\ 3 \overline{)18} \end{array}$	18 divided by 3 is 6. 18 divided by 6 is 3.
c)	$3 \times 7 = 21$ $3 \times 7 = 21$	$21 \div 7 = 3$ $21 \div 3 = 7$	$\begin{array}{r} 3 \\ 7 \overline{)21} \\ \underline{7} \\ 3 \overline{)21} \end{array}$	21 divided by 7 is 3. 21 divided by 3 is 7.
d)	$5 \times 9 = 45$ $9 \times 5 = 45$	$45 \div 9 = 5$ $45 \div 5 = 9$	$\begin{array}{r} 5 \\ 9 \overline{)45} \\ \underline{9} \\ 5 \overline{)45} \end{array}$	45 divided by 9 is 5. 45 divided by 5 is 9.

B. Give the answer.

- |      |      |      |
|------|------|------|
| a. 8 | c. 6 | e. 8 |
| b. 5 | d. 7 | f. 4 |

C. Find the quotients.

- |         |         |
|---------|---------|
| a. 9 R5 | c. 4 R4 |
| b. 7 R1 | d. 8 R5 |

D. For each number, identify if it is divisible by 2, 3, 5, and, 9.

	<b>Number</b>	<b>2</b>	<b>3</b>	<b>5</b>	<b>9</b>
<b>a)</b>	135	No	Yes	Yes	Yes
<b>b)</b>	384	Yes	Yes	No	No
<b>c)</b>	4 614	Yes	Yes	No	No
<b>d)</b>	495	No	Yes	Yes	Yes
<b>e)</b>	648	Yes	Yes	No	Yes
<b>f)</b>	745	No	No	Yes	No

**E. Find the quotients.**

- a. 37
- b. 42
- c. 183
- d. 35

**F. Find the quotients.**

- a. 28 R2
- b. 24 R1
- c. 35 R1
- d. 11 R4

**G. Find the quotients.**

- a. 87 R6
- b. 323 R1
- c. 260 R1
- d. 93 R2

**H. Find the quotients.**

- a. 213 R10
- b. 26
- c. 1 234 R36
- d. 32
- e. 123
- f. 50 R702
- g. 202 R111
- h. 299 R45

**I. Find the quotients.**

- a. 38 R645
- b. 185 R92
- c. 492 R3
- d. 173 R42

**J. Quickly find the quotients. Remember to cancel the same number of zeros in both the divisor and dividend in each question.**

- a. 250
- b. 60
- c. 40
- d. 90

**K. Give an estimated quotient. Show your rounding.**

a.  $1600 \div 40 = 400$

c.  $64000 \div 800 = 80$

b.  $8500 \div 50 = 170$

d.  $540000 \div 6000 = 90$

**L. Word Problems**

a. 2 865 cars per day

d.  $16000 \div 80 = 200$  200 seats per section

b. 576 pucks per hour

c. 91 km per hour

**M. Solve the cost per unit price.**

a. \$2

b. \$3

**N. Solve the unit price and then underline the best buy.**

a. \$3, \$2, 5 L of antifreeze for \$10 is the best buy

b. \$2, \$3, 8 kilograms of bird seed for \$16 is the best buy

**O. Word Problems.**

a. 83 batches

c. 53 909 parts

b. 40 600 kilograms

d. 90 264 kilometres

## Unit 3: Change and The Metric System



## Topic A: Counting to Make Change

Practice your counting by filling in the counting chart. Have your instructor check your chart when you are done.

0	1	2	3	4	5	6	7	8	9
10									

Use your counting chart and start at 0. Count two and write down that number.

0	2	4							

If you had a pile of toonies or two dollar coins and wanted to know how much money you have, you would count by 2's.

Use your counting chart and start at 0. Count five and write down that number.

0	5	10	

If you had a pile of nickels or five dollar bills and wanted to know how much money you have, you would count by 5's.

Use your counting chart and start at 0. Count ten and write down that number.

0	10	20	

If you had a pile of dimes or ten dollar bills and wanted to know how much money you have, you would count by 10's.

Use your counting chart and start at 0. Count twenty and write down that number.

0	20	40			
---	----	----	--	--	--

If you had a pile of twenty dollar bills and wanted to know how much money you have, you would count by 20's.

Use your counting chart and start at 0. Count twenty-five and write down that number.

0	25			
---	----	--	--	--

If you had a pile of quarters and wanted to know how much money you have, you would count by 25's.

### Exercise 1

Write the missing numerals. Check your work using the answer key at the end of the exercise.

- a. Count by 5's.

0		10		20		30		40	
50		60		70		80		90	

- b. Count by 5's.



0	5		15		25		35		45
	55		65		75		85		95

c. Count by 5's.

0									

d. Count by 10's.

0	10		30		50		70		90	
---	----	--	----	--	----	--	----	--	----	--

e. Count by 10's.

0		20		40		60		80		100
---	--	----	--	----	--	----	--	----	--	-----

f. Count by 10's.

0									
---	--	--	--	--	--	--	--	--	--

g. Count by 20's

0		40		80	
---	--	----	--	----	--

h. Count by 20's

0					
---	--	--	--	--	--

i. Count by 25's.

0	25		75	
---	----	--	----	--

j. Count by 25's.

0		50		100
---	--	----	--	-----

k. Count by 25's.

0				
---	--	--	--	--

**Answers to Exercise 1**

a. Count by 5's.

0	5	10	15	20	25	30	35	40	45
50	55	60	65	70	75	80	85	90	95

b. Count by 5's.

0	5	10	15	20	25	30	35	40	45
50	55	60	65	70	75	80	85	90	95

c. Count by 5's.

0	5	10	15	20	25	30	35	40	45
50	55	60	65	70	75	80	85	90	95

d. Count by 10's.

0	10	20	30	40	50	60	70	80	90	100
---	----	----	----	----	----	----	----	----	----	-----

e. Count by 10's.

0	10	20	30	40	50	60	70	80	90	100
---	----	----	----	----	----	----	----	----	----	-----

f. Count by 10's.

0	10	20	30	40	50	60	70	80	90	100
---	----	----	----	----	----	----	----	----	----	-----

g. Count by 20's

0	20	40	60	80	100
---	----	----	----	----	-----

h. Count by 20's

0	20	40	60	80	100
---	----	----	----	----	-----

i. Count by 25's.

0	25	50	75	100
---	----	----	----	-----

j. Count by 25's.

0	25	50	75	100
---	----	----	----	-----

k. Count by 25's.

0	25	50	75	100
---	----	----	----	-----



## Topic B: Making Change

When you make change, your first goal is to get a number that ends in 0 or 5. For example, if you bought something for \$4, the first thing to do would be to get to \$5. Check out example A below.

### Example A

\$4 to \$5

To get from \$4 to \$5, you would need 1 loonie.

### Example B

\$23 to \$25

To get from \$23 to \$25, you would need 1 toonie.

### Example C

\$55 to \$60

To get from \$55 to \$60, you would need 1 five dollar bill.

### Exercise 1

Circle the number of coins or bills you would need to get from the first number to the second number. Make sure to use the least number of coins or bills. Check your work using the answer key at the end of the exercise.

- a. \$33 to \$35



b. \$48 to \$50



c. \$16 to \$20



d. \$68 to \$70



e. \$10 to \$15



f. \$35 to \$40



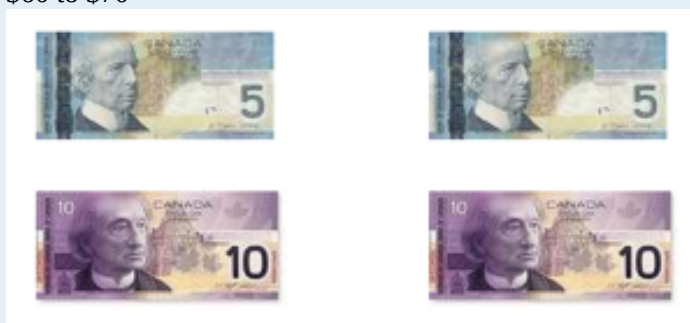
g. \$55 to \$60



h. \$85 to \$90



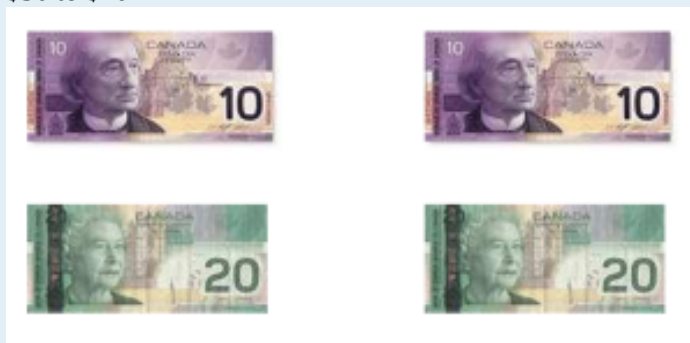
i. \$60 to \$70



j. \$90 to \$100



k. \$30 to \$40

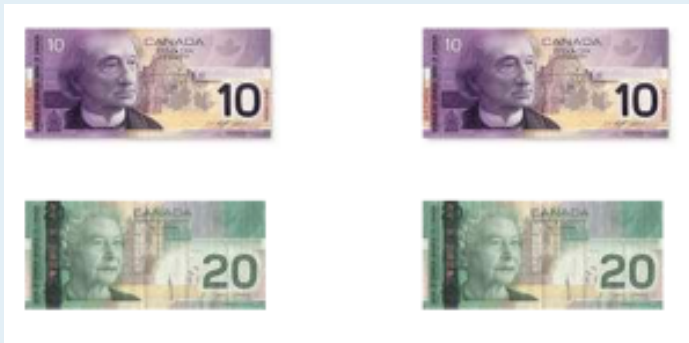


l. \$40 to \$50

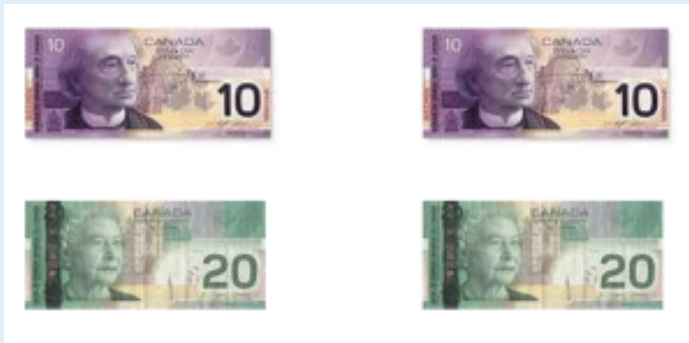




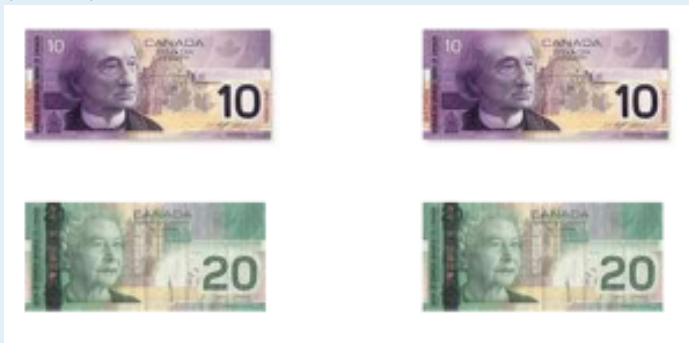
m. \$30 to \$50



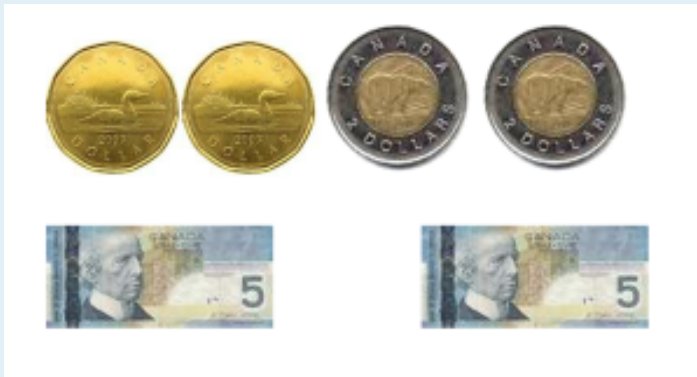
n. \$70 to \$80



o. \$80 to \$100



p. \$45 to \$50



q. \$21 to \$25



r. \$55 to \$60



s. \$45 to \$50



t. \$40 to \$50



u. \$70 to \$80



**Answers to Exercise 1**

- |                |                |
|----------------|----------------|
| a. 1 toonie    | l. 1 \$10 bill |
| b. 1 toonie    | m. 1 \$20 bill |
| c. 2 toonies   | n. 1 \$10 bill |
| d. 1 toonie    | o. 1 \$20 bill |
| e. 1 \$5 bill  | p. 1 \$5 bill  |
| f. 1 \$5 bill  | q. 2 toonies   |
| g. 1 \$5 bill  | r. 1 \$5 bill  |
| h. 1 \$5 bill  | s. 1 \$5 bill  |
| i. 1 \$10 bill | t. 1 \$10 bill |
| j. 1 \$10 bill | u. 1 \$10 bil  |
| k. 1 \$10 bill |                |

Exercise 2

State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible. Check your work using the answer key at the end of the exercise.

**Example:** \$56 to \$60. You require 2 toonies to get to \$60.

- |                  |                 |
|------------------|-----------------|
| a. \$28 to \$30  | e. \$54 to \$55 |
| b. \$35 to \$40  | f. \$30 to \$50 |
| c. \$90 to \$100 | g. \$65 to \$70 |
| d. \$32 to \$50  | h. \$45 to \$50 |

**Answers to Exercise 2**

- |  |                |
|--|----------------|
| a. 1 toonie  | e. 1 loonie    |
| b. 1 \$5 bill                                      | f. 1 \$20 bill |
| c. 1 \$10 bill                                     | g. 1 \$5 bill  |
| d. 1 \$10 bill, 1 \$5 bill, 1 toonie, and 1 loonie | h. 1 \$5 bill  |

Example D

**\$28 to \$50**

Need	To get to
1 toonie	\$30
1 \$20 bill	\$50

Example E

**\$36 to \$50**

Need	To get to
2 toonies	\$40
1 \$10 bill	\$50

Example F

**\$63 to \$80**

Need	To get to
1 toonie	\$65
1 \$5 bill	\$70
1 \$10 bill	\$80

Exercise 3

State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible. Check your work using the answer key at the end of the exercise.

Example:

**\$67 to \$80**

Need	To get to
1 loonie	\$68
1 toonie	\$70
1 \$10 bill	\$80

a.

**\$26 to \$40**

Need	To get to

b.

**\$47 to \$60**

Need	To get to

c. **\$69 to \$80**

Need	To get to

g. **\$78 to \$100**

Need	To get to

d. **\$18 to \$20**

Need	To get to

h. **\$82 to \$100**

Need	To get to

e. **\$34 to \$50**

Need	To get to

i. **\$93 to \$100**

Need	To get to

f. **\$51 to \$60**

Need	To get to

j. **\$3 to \$10**

Need	To get to

**Answers to Exercise 3**

a. **\$26 to \$40**

Need	To get to
2 toonies	\$30
1 \$10 bill	\$40

f. **\$51 to \$60**

Need	To get to
2 toonies	\$55
1 \$5 bill	\$60

b. **\$47 to \$60**

Need	To get to
1 loonie	\$48
1 toonie	\$50
1 \$10	\$60

g. **\$78 to \$100**

Need	To get to
1 toonie	\$80
1 \$20 bill	\$100

c. **\$69 to \$80**

Need	To get to
1 loonie	\$70
1 \$10 bill	\$80

h. **\$82 to \$100**

Need	To get to
1 loonie	\$83
1 toonie	\$85
1 \$5 bill	\$90
1 \$10 bill	\$100

d. **\$18 to \$20**

Need	To get to
1 toonie	\$20

i. **\$93 to \$100**

Need	To get to
1 toonie	\$95
1 \$5 bill	\$100

e. **\$34 to \$50**

Need	To get to
2 toonies	\$40
1 \$10 bill	\$50

j. **\$3 to \$10**

Need	To get to
1 toonie	\$5
1 \$5 bill	\$10

Exercise 4

State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible. Check your work using the answer key at the end of the exercise.

Example: \$67 to \$100

Need	To get to
1 loonie	\$68
1 toonie	\$70
1 \$10 bill	\$80
1 \$20 bill	\$100

a. \$26

Need	To get to

d. \$49

Need	To get to

b. \$13

Need	To get to

e. \$38

Need	To get to

c. \$57

Need	To get to

f. \$74

Need	To get to

**Answers to Exercise 4**



a. **\$26**

Need	To get to
2 toonies	\$30
1 \$10 bill	\$40
3 \$20 bills	\$100

d. **\$49**

Need	To get to
1 loonie	\$50
1 \$10 bill	\$60
2 \$20 bills	\$100

b. **\$13**

Need	To get to
1 toonie	\$15
1 \$5 bill	\$20
4 \$20 bills	\$100

e. **\$38**

Need	To get to
1 toonie	\$40
3 \$20	\$100

c. **\$57**

Need	To get to
1 loonie	\$58
1 toonie	\$60
2 \$20 bills	\$100

f. **\$74**

Need	To get to
3 toonies	\$80
1 \$20 bill	

Exercise 5

State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible. Check your work using the answer key at the end of the exercise.

**Example A: \$2.69 from \$5.00**

Need	To get to
1 penny	\$2.70
1 nickel	\$2.75
1 quarter	\$3.00
1 toonie	\$5.00

**Example B: \$6.29 from \$10.00**











s. **\$72.84 from \$100**

Need	To get to

u. **\$5.23 from \$20.00**

Need	To get to

t. **\$83.91 from \$100**

Need	To get to

v. **\$19.56 from \$40.00**

Need	To get to

**Answers to Exercise 5**

a. **\$2.19 from \$10.00**

Need	To get to
1 penny	\$2.20
1 nickel	\$2.25
3 quarters	\$3
1 toonie	\$5
1 \$5 bill	\$10

b. **\$6.48 from \$20.00**

Need	To get to
2 pennies	\$6.50
2 quarters	\$7
1 loonie	\$8
1 toonie	\$10
1 \$10 bill	\$20

c. **\$8.67 from \$20.00**

Need	To get to
3 pennies	\$8.70
1 nickel	\$8.75
1 quarter	\$9
1 loonie	\$10
1 \$10 bill	\$20

g. **\$20.51 from \$40.00**

Need	To get to
4 pennies	\$20.55
2 dimes	\$20.75
1 quarter	\$21
2 toonies	\$25
1 \$5 bill	\$30
1 \$10 bill	\$40

d. **\$3.35 from \$10.00**

Need	To get to
1 nickel	\$3.40
1 dime	\$3.50
2 quarters	\$4
1 loonie	\$5
1 \$5 bill	\$10

h. **\$37.72 from \$50.00**

Need	To get to
3 pennies	\$37.75
1 quarter	\$38
1 toonie	\$40
1 \$10 bill	\$50

e. **\$17.81 from \$20.00**

Need	To get to
4 pennies	\$17.85
1 nickel	\$17.90
1 dime	\$18
1 toonie	\$20

i. **\$19.87 from \$50.00**

Need	To get to
3 pennies	\$19.90
1 dime	\$20
1 \$10 bill	\$30
1 \$20 bill	\$50

f. **\$50.22 from \$60.00**

Need	To get to
3 pennies	\$50.25
3 quarters	\$51
2 toonies	\$55
1 \$5 bill	\$60

j. **\$4.36 from \$5.00**

Need	To get to
4 pennies	\$4.40
1 dime	\$4.50
2 quarters	\$5



k. **\$44.54 from \$60.00**

Need	To get to
1 penny	\$44.55
2 dimes	\$44.75
1 quarter	\$45
1 \$5 bill	\$50
1 \$10 bill	\$60

l. **\$29.14 from \$40.00**

Need	To get to
1 penny	\$29.15
1 dime	\$29.25
3 quarters	\$30
1 \$10 bill	\$40

m. **\$65.76 from \$80.00**

Need	To get to
4 pennies	\$65.80
2 dimes	\$66
2 toonies	\$70
1 \$10 bill	\$80

n. **\$41.98 from \$60.00**

Need	To get to
2 pennies	\$42
1 loonie	\$43
1 toonie	\$45
1 \$5 bill	\$50
1 \$10 bill	\$60

o. **\$97.69 from \$100**

Need	To get to
1 penny	\$97.70
1 nickel	\$97.75
1 quarter	\$98
1 toonie	\$100

p. **\$32.02 from \$35.00**

Need	To get to
3 pennies	\$32.05
2 dimes	\$32.25
3 quarters	\$33
1 toonie	\$35

q. **\$58.27 from \$100**

Need	To get to
1 dime	\$61.25
3 quarters	\$62
1 loonie	\$63
1 toonie	\$65
1 \$5 bill	\$70
1 \$10 bill	\$80

r. **\$61.15 from \$80.00**

Need	To get to
1 dime	\$61.25
3 quarters	\$62
1 loonie	\$63
1 toonie	\$65
1 \$5 bill	\$70
1 \$10 bill	\$80

s. **\$72.84 from \$100**

Need	To get to
1 penny	\$72.85
1 nickel	\$72.90
1 dime	\$73
1 toonie	\$75
1 \$5 bill	\$80
1 \$20 bill	\$100

t. **\$83.91 from \$100**

Need	To get to
4 pennies	\$83.95
1 nickel	\$84
1 loonie	\$85
1 \$5 bill	\$90
1 \$10 bill	\$100

u. **\$5.23 from \$20.00**

Need	To get to
2 pennies	\$5.25
3 quarters	\$6
2 toonies	\$10
1 \$10 bill	\$20

v. **\$19.56 from \$40.00**

Need	To get to
4 pennies	\$19.60
1 nickel	\$19.65
1 dime	\$19.75
1 quarter	\$20
1 \$20 bill	\$40

## Exercise 6

State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible. Check your work using the answer key at the end of the exercise.

a. \$1.74 from \$10.00

c. \$96.43 from \$100.00

b. \$54.05 from \$60.00

d. \$28.16 from \$40.00

e. \$73.97 from \$80.00

g. \$9.38 from \$20.00

f. \$32.81 from \$50.00

h. \$85.25 from \$100.00

**Answers to Exercise 6**

a. \$1.74 from \$10.00

- 1 penny
- 1 quarter
- 1 loonie
- 1 toonie

b. \$54.05 from \$60.00

- 2 dimes
- 3 quarters
- 1 \$5 bill

c. \$96.43 from \$100.00

- 2 pennies
- 1 nickel
- 2 quarters

d. \$28.16 from \$40.00

- 4 pennies
- 1 nickel
- 3 quarters
- 1 loonie

e. \$73.97 from \$80.00

◦ 3 pennies

◦ 1 loonie

◦ 1 \$5 bill

f. \$32.81 from \$50.00

◦ 4 pennies

◦ 1 nickel

◦ 1 dime

◦ 1 toonie

◦ 1 \$5 bill

◦ 1 \$10 bill

g. \$9.38 from \$20.00

◦ 2 pennies

◦ 1 dime

◦ 2 quarters

◦ 1 \$10 bill

h. \$85.25 from \$100.00

◦ 3 quarters

◦ 2 toonies

◦ 1 \$10 bill

**Exercise 7**

State the number and kind of coins and bills you would need to

get change from \$100. Make sure you use the least number of coins and bills as possible. Check your work using the answer key at the end of the exercise.



- a. 1 kg of chicken for \$24.59



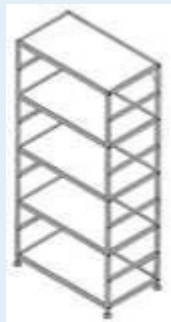
- e. Skates cost \$67.49



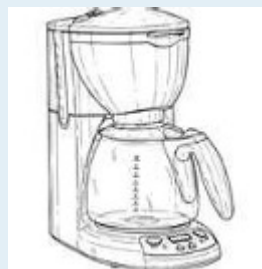
- b. DVD Player for \$25.73



- f. Floor lamp costs \$73.91



- c. Metal shelf for \$75.59



- g. coffee maker costs \$22.39



- d. Heavy duty drill costs \$89.89



- h. a package of toilet paper costs \$6.71



- i. a box of laundry detergent costs \$13.43



- j. a can of baby formula costs \$30.23

### Answers to Exercise 7

- |   |  |
|---|--|
| a. 1 penny, 1 nickel, 1 dime, 1 quarter, 1 \$5 bill, 1 \$10 bill, 3 \$20 bill | bill   |
| b. 2 pennies, 1 quarter, 2 toonies, 1 \$10 bill, 3 \$20 bill                  | g. 1 penny, 1 dime, 2 quarters, 1 toonie, 1 \$5 bill, 1 \$10 bill, 3 \$20 bill |
| c. 1 penny, 1 nickel, 1 dime, 1 quarter, 2 toonie, 1 \$20 bill                | h. 4 pennies, 1 quarter, 1 loonie, 1 toonie, 1 \$10 bill, 4 \$20 bill          |
| d. 1 penny, 1 dime, 1 \$10 bill   | i. 2 pennies, 1 nickel, 2 quarters, 1 loonie, 1 \$5 bill, 4 \$20 bill          |
| e. 1 penny, 2 quarters, 1 toonie, 1 \$10 bill, 1 \$20 bill                    | j. 2 pennies, 3 quarters, 2 toonies, 1 \$5 bill, 3 \$20 bill                   |
| f. 4 pennies, 1 nickel, 1 loonie, 1 \$5 bill, 1 \$20                          |  |

### Exercise 8

State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible. Check your work using the answer key at the end of the exercise.

- Mrs. Bhabra bought a food processor that cost \$55.99. What change will she get from \$100?
- Pablo bought Lego for \$30.23. What change will she get from \$100?
- A case of 6 bottles of motor oil costs \$43.67. What change will you get from?
- Shampoo costs \$3.99 and conditioner costs \$4.99. Together with taxes they cost \$10.06. What change will you get from \$100?

### Answers to Exercise 8

- 1 penny, 2 toonies, 2 \$20 bills
- 2 pennies, 3 quarters, 2 toonies, 1 \$5 bill, 3 \$20 bills
- 3 pennies, 1 nickel, 1 quarter, 1 loonie, 1 \$5 bill, 1 \$10 bill, 2 \$20 bills
- 4 pennies, 1 nickel, 1 dime, 3 quarters, 2 toonies, 1 \$5 bill, 4 \$20 bills

## Topic B: Self-Test

Mark /21 Aim 17/21

A. Circle the number of coins and bills needed to get from the first number to the second number. Use the least number of coins. (4 marks)

a. \$76 to \$80



b. \$22 to \$25



c. \$40 to \$50



d. \$55 to \$60



- B. State the number and kind of coins or bills are needed to get from the first number to the second number. (4 marks)
- |                 |                  |
|-----------------|------------------|
| a. \$48 to \$50 | c. \$95 to \$100 |
| b. \$76 to \$80 | d. \$40 to \$50  |
- C. State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible. (4 marks)
- |                 |                  |
|-----------------|------------------|
| a. \$37 to \$50 | c. \$42 to \$60  |
| b. \$16 to \$50 | d. \$81 to \$100 |
- D. State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible. (9 marks)
- |                               |  |
|-------------------------------|--|
| a. \$23                       | g. gas for the car cost \$61.59  |
| b. \$41                       | h. Czelinski bought a new vacuum cleaner for \$86.32. What change will get from \$100?       |
| c. \$68                       |  |
| d. \$72                       | i. Uchida bought a new frying pan for \$39.19. How much change will she get back from \$100? |
| e. groceries cost \$89.63     |  |
| f. telephone bill was \$51.08 |  |

### Answers to Topic B Self-Test

- |                       |                |
|-----------------------|----------------|
| a. 2 toonies          | c. 1 \$10 bill |
| b. 1 loonie, 1 toonie | d. 1 \$5 bill  |
| a. 1 toonie           | c. 1 \$5 bill  |
| b. 2 toonies          | d. 1 \$10 bill |

- a. 1 toonie, 1 toonie, 1 \$10 bill
- b. 2 toonies, 1 \$10 bill, 1 \$20 bill
- a. 1 toonie, 1 \$5 bill, 1 \$10 bill, 3 \$20 bill
- b. 2 toonies, 1 \$5 bill, 1 \$10 bill, 2 \$20 bills
- c. 1 toonie, 1 \$10 bill, 1 \$20 bills
- d. 1 loonie, 1 toonie, 1 \$5 bill, 1 \$20 bill
- e. 2 pennies, 1 dime, 1 quarter, 1 \$10 bill
- f. 2 pennies, 1 nickel, 1 dime, 3 quarters, 1 loonie, 1 toonie, 1 \$5 bill, 2 \$20 bills
- c. 1 loonie, 1 toonie, 1 \$5 bill, 1 \$10 bill
- d. 2 toonies, 1 \$5 bill, 1 \$10 bill
- g. 1 penny, 1 nickel, 1 dime, 1 quarter, 1 loonie, 1 toonie, 1 \$5 bill, 1 \$10 bill, 1 \$20 bill
- h. 3 pennies, 1 nickel, 1 dime, 2 quarters, 1 loonie, 1 toonie, 1 \$10 bill
- i. 1 penny, 1 nickel, 3 quarters, 1 \$20 bills



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## Topic C: The Metric System

When you measure something, you are **comparing**. Measurement is comparing something with a **standard unit of measure**.

In the past, units of measure were based on things found in a community. Often, lengths of parts of the body were used to measure:

- Inch: the width of a thumb
- Span: the distance from tip of thumb to tip of little finger when the hand is spread out
- Foot: the distance from big toe to heel of foot
- Yard (becomes “rod”): the distance from tip of nose to tip of thumb of an outstretched hand and arm
- Cubit: the distance from the tip of the middle finger to the elbow
- Fathom: the distance from the tip of one hand to the tip of the other with both arms stretched out
- Mile: 1000 military double steps in the Roman army (*mile passuum* means “1000 paces”)

The problem with these units was the distances would be different based on the size of the person doing the measuring. The problem grew even more when trade was started between cities.

Over a long period of time, people in different countries came up with different standard units of measure.

The British came up with **imperial units** such as inch, foot, yard and mile.

The French came up with **metric units** such as metre, centimetre, litre and gram. In Canada, we use both metric and imperial units.

### Measuring Length

The basic unit of measure for length is the **metre** (abbreviation **m**). If you stretch your arm straight out beside you, a **metre** is about the distance from the tip of your nose to the tip of your middle finger.

## Exercise 1

Consider the following distances. Answer yes or no if you would use a metre to measure. Check your work using the answer key at the end of the exercise.

**Example:**

- The length of a table – Yes
  - The width of your watchband – No
- |   |  |
|---|--|
| a. length of your classroom                   | i. the length of the hallway outside your classroom      |
| b. thickness of a piece of paper              | j. the distance from your home to college                |
| c. length of your pen or pencil               | k. the height of your coffee mug                         |
| d. height of the door                         | l. the width of your book                                |
| e. distance from Prince George to Fort Nelson | m. the distance from your home to Moncton, New Brunswick |
| f. the width of your baby finger              | n. the length of a city bus                              |
| g. the size of a postage stamp                |  |
| h. the thickness of a quarter                 |  |

**Answers to Exercise 1**

- |        |        |
|--------|--------|
| a. yes | h. no  |
| b. no  | i. yes |
| c. no  | j. no  |
| d. yes | k. no  |
| e. no  | l. no  |
| f. no  | m. no  |
| g. no  | n. yes |

## Exercise 2

Estimate the length of each item. Remember a metre is about the distance from the tip of your nose to the tip of your middle finger when your arm is stretched out beside you. Be sure to include the unit of measure in your answer. Have your instructor check your work.

- |                              |                             |
|------------------------------|-----------------------------|
| a. the height of the doorway | c. the width of the doorway |
| b. the height of your table  | d. the length of your arm   |

- |   |                                 |
|---|---------------------------------|
| e. the distance from the floor to hip   | h. the width of the window      |
| f. the distance from the floor to waist | i. the length of your classroom |
| g. the height of the ceiling            | j. the width of your classroom  |

### Exercise 3

Circle the most reasonable measure. Remember a metre is about the distance from the tip of your nose to the tip of your middle finger when your arm is stretched out beside you. Check your work using the answer key at the end of the exercise.

- |                          |                                 |
|--------------------------|---------------------------------|
| a. A person's height     | d. The length of a bed          |
| i. 2m                    | i. 200 m                        |
| ii. 20m                  | ii. 2 m                         |
| iii. 200m                | iii. 20 m                       |
| b. The height of a child | e. The height of a building     |
| i. 10 m                  | i. 1 m                          |
| ii. 100 m                | ii. 100 m                       |
| iii. 1 m                 | iii. 10 m                       |
| c. The length of a house | f. The height of a refrigerator |
| i. 150 m                 | i. 20 m                         |
| ii. 15 m                 | ii. 200 m                       |
| iii. 1 m                 | iii. 2 m                        |

#### Answers to Exercise 3

- |        |        |
|--------|--------|
| a. i   | d. ii  |
| b. iii | e. ii  |
| c. ii  | f. iii |

## Measuring Small Lengths and Long Distances

It is hard to measure small things using a metre. To measure small things, you can use **centimetre (cm) or millimetre (mm)**.

A **centimetre (cm)** is about the width of your baby finger. Remember it is just a guide. A **millimetre (mm)** is about the thickness of your fingernail.

It is hard to measure long distances using a metre. To measure long distances, you can use **kilometre (km)**. A kilometre is 1000 metres.

#### Exercise 4

For each item, circle the unit of measure you would use. Check your work using the answer key at the end of the exercise

	Item	Unit of Measure
a)	the width of a room	m, cm, mm
b)	the thickness of a coin	m, cm, mm
c)	the length of your pencil	m, cm, mm
d)	the length of the hall	m, cm, mm
e)	the length of this page	m, cm, mm
f)	the length of a screw	m, cm, mm
g)	the height of your cup	m, cm, mm
h)	the length of a bus	m, cm, mm
i)	the thickness of a window pane	m, cm, mm
j)	the width of a chair	m, cm, mm

#### Answers to Exercise 4

- |       |       |
|-------|-------|
| a. m  | f. mm |
| b. mm | g. cm |
| c. cm | h. m  |
| d. m  | i. mm |
| e. cm | j. cm |

## Exercise 5

For each item, circle the letter of the most reasonable unit of measure. Check your work using the answer key at the end of the exercise.

- |  |  |
|--|--|
| <p>a. The width of a doorway</p> <ul style="list-style-type: none"> <li>i. 50 mm</li> <li>ii. 1 m</li> <li>iii. 50 m</li> </ul>        | <p>f. The height of the kitchen counter</p> <ul style="list-style-type: none"> <li>i. 9 m</li> <li>ii. 9 cm</li> <li>iii. 90 cm</li> </ul> |
| <p>b. The length of your pencil</p> <ul style="list-style-type: none"> <li>i. 20 m</li> <li>ii. 20 mmm</li> <li>iii. 20 m</li> </ul>   | <p>g. The distance around your wrist</p> <ul style="list-style-type: none"> <li>i. 15 mm</li> <li>ii. 15 cm</li> <li>iii. 15 m</li> </ul>  |
| <p>c. The height of a tall building</p> <ul style="list-style-type: none"> <li>i. 1 m</li> <li>ii. 100 m</li> <li>iii. 10 m</li> </ul> | <p>h. The width of a small TV screen</p> <ul style="list-style-type: none"> <li>i. 28 mm</li> <li>ii. 128 cm</li> <li>iii. 28 m</li> </ul> |
| <p>d. The height of a refrigerator</p> <ul style="list-style-type: none"> <li>i. 20 m</li> <li>ii. 200 m</li> <li>iii. 2 m</li> </ul>  | <p>i. The length of a car</p> <ul style="list-style-type: none"> <li>i. 5 m</li> <li>ii. 5 m</li> <li>iii. 5 mm</li> </ul>                 |
| <p>e. The diameter of a quarter</p> <ul style="list-style-type: none"> <li>i. 24 mm</li> <li>ii. 24 cm</li> <li>iii. 24 m</li> </ul>   | <p>j. The height of a bookcase</p> <ul style="list-style-type: none"> <li>i. 2 cm</li> <li>ii. 2 mm</li> <li>iii. 2 m</li> </ul>           |

**Answers to Exercise 5**

- |   |   |
|---|---|
| <p>a. ii</p> <p>b. iii</p> <p>c. ii</p> <p>d. iii</p> <p>e. i</p> | <p>f. iii</p> <p>g. ii</p> <p>h. ii</p> <p>i. i</p> <p>j. iii</p> |
|---|---|

## Exercise 6

Fill in the blank with the most reasonable unit of measure. Check your work using the answer key at the end of the exercise

- a. Most hand held calculators are about 15 \_\_\_\_ long.
- b. The CN Tower in Toronto is 555 \_\_\_\_ tall.
- c. Many young men have an 80 \_\_\_\_ waist.
- d. Computer monitor screens are 28 \_\_\_\_ wide.
- e. The handle of a hammer is 20 \_\_\_\_ long.
- f. A table is about 65 \_\_\_\_ long.
- g. The seat of a chair is about 30 \_\_\_\_ above the floor.
- h. The window is about 3 \_\_\_\_ long.
- i. A roll of tape is about 13 \_\_\_\_ wide.
- j. A rope is about 7 \_\_\_\_ thick.

**Answers to Exercise 6**

- |       |       |
|-------|-------|
| a. cm | f. cm |
| b. m  | g. cm |
| c. cm | h. m  |
| d. cm | i. mm |
| e. cm | j. mm |

**Measuring Capacity (Volume)**

Volume is a measure of how much space something takes up. The basic unit of measure for volume is the **Litre (L)**.

Can you think of two things that we buy in litres? We buy gasoline and milk in litres.

We use **millilitres (mL)** to measure small volumes. For example, a small cup of coffee is about 180 mL. Can you think of two things we buy in mL?

## Exercise 7

Write the unit of measure you would use to measure each item (L or mL). Check your work using the answer key at the end of the exercise.

- |                          |                  |
|--------------------------|------------------|
| a. Bottle of pop         | h. Mixing bowls  |
| b. Gasoline              | i. Ketchup       |
| c. Car window wash       | j. Shampoo       |
| d. Can of beans          | k. Vinegar       |
| e. Large bottle of juice | l. Bathtub       |
| f. Liquid dish soap      | m. Ice cube tray |
| g. Cough syrup           | n. Paint         |

**Answers to Exercise 7**

- |            |            |
|------------|------------|
| a. mL      | h. L       |
| b. L       | i. mL or L |
| c. L       | j. mL      |
| d. mL      | k. L       |
| e. L       | l. L       |
| f. mL or L | m. mL      |
| g. mL      | n. L       |

## Exercise 8

Circle the letter of the most reasonable unit of measure. Check your work using the answer key at the end of the exercise.

- |                                   |                       |
|-----------------------------------|-----------------------|
| a. A can of soup                  | ii. 500 L             |
| i. 3 L                            | iii. 50L              |
| ii. 30 mL                         | c. A hot water heater |
| iii. 300 mL                       | i. 200 mL             |
| b. A large container of ice cream | ii. 50 L              |
| i. 5 L                            | iii. 200 L            |

- |                          |                          |
|--------------------------|--------------------------|
| d. A cup of tea          | ii. 4 mL                 |
| i. 18 mL                 | iii. 40 mL               |
| ii. 180 mL               | h. The gas tank of a car |
| iii. 218 L               | i. 500 mL                |
| e. A garbage can         | ii. 5 L                  |
| i. 120 L                 | iii. 50 L                |
| ii. 120 mL               | i. A jar of mustard      |
| iii. 12 L                | i. 150 mL                |
| f. A saucepan            | ii. 15 L                 |
| i. 2 L                   | iii. 15 mL               |
| ii. 20 L                 | j. A large mixing bowl   |
| iii. 2 mL                | i. 6 mL                  |
| g. A dose of cough syrup | ii. 60 L                 |
| i. 40 L                  | iii. 6 L                 |

### Answers to Exercise 8

- |        |        |
|--------|--------|
| a. iii | f. i   |
| b. i   | g. ii  |
| c. iii | h. iii |
| d. ii  | i. i   |
| e. i   | j. iii |

## Measuring Mass

Mass is a measure of matter in something. The basic unit of measure for mass is the **gram (g)**. We buy sliced meats, bulk food, spices and cereal in grams.

We use **kilogram (kg)** to measure the mass of large things such as cars, people, flour and sugar. Can you think of two things that we buy in kilograms?

We use **milligram (mg)** to measure the mass of small things such as medicine or vitamins. A **milligram** is very small. Can you think of two things that we buy in milligrams?



## Exercise 9

Circle the unit of measure you would use to measure each item. Check your work using the answer key at the end of the exercise

	Item	Unit of Measure
a)	Pasta	mg, g, kg
b)	Vitamin C	mg, g, kg
c)	Peanut butter	mg, g, kg
d)	Flour	mg, g, kg
e)	Nails	mg, g, kg
f)	Dry dog food	mg, g, kg
g)	Rice	mg, g, kg
h)	Cookies	mg, g, kg
i)	Apples	mg, g, kg
j)	Spices	mg, g, kg
k)	Cement	mg, g, kg
l)	Medicine tablets	mg, g, kg
m)	The family pet	mg, g, kg
n)	A coin	mg, g, kg

**Answers to Exercise 9**

- |            |       |
|------------|-------|
| a. g or kg | h. g  |
| b. mg      | i. kg |
| c. c or kg | j. g  |
| d. kg      | k. kg |
| e. kg      | l. mg |
| f. kg      | m. kg |
| g. kg      | n. g  |

## Exercise 10

Circle the letter of the most reasonable unit of measure. Check your work using the answer key at the end of the exercise.

a. A nickel

- i. 5 kg
- ii. 5 g
- iii. 50 g

b. A small television

- i. 8 g
- ii. 8 kg
- iii. 80 g

c. A flashlight battery

- i. 8 g
- ii. 8 kg
- iii. 80 g

d. A baby

- i. 30 kg
- ii. 3 kg
- iii. 300 kg

e. A dinner fork

- i. 50 g
- ii. 5 g
- iii. 5 kg

f. A slice of bread

- i. 2 g
- ii. 20 g
- iii. 2 kg

g. A sugar cube

- i. 2 mg
- ii. 20 g
- iii. 2 g

h. A refrigerator

- i. 120 g
- ii. 120 kg
- iii. 12 kg

i. A bag of potatoes

- i. 5 g
- ii. 5 kg
- iii. 50 mg

j. A car

- i. 100 kg
- ii. 1000 kg
- iii. 10 kg

k. A chocolate bar

- i. 300 mg
- ii. 300 mg
- iii. 300 g

l. A back pack

- i. 12 kg
- ii. 12 g
- iii. 12 mg

**Answers to Exercise 10**

- a. ii
- b. ii

- c. i
- d. ii

- |        |        |
|--------|--------|
| e. i   | i. ii  |
| f. ii  | j. ii  |
| g. iii | k. iii |
| h. ii  | l. i   |

## Metric Prefixes

In the metric system a prefix is used to tell if something is large or small. A **prefix** is a part of a word that is added to the start of word to change the meaning.

The base units of measure in the metric system are the **metre (m)**, **litre (L)** and **gram (g)**.

If the prefix **kilo** is added to one of the base units of measures, such as kilometre or kilogram, you know that these are large amounts.

A **kilometre** is 1 000 metres.

A **kilogram** is 1 000 grams.

If the prefix **centi** or **milli** is added to one of the base units of measure, such as centimetre or milligram, you know that these are small amounts.

It takes 100 **centimetres** to make a metre. It takes 1 000 **milligrams** to make a gram.

Measures	Large	Base	Small
Length	kilometre (km)	metre (m)	centimetre (cm) millimetre (mm)
Volume		litre (L)	millilitre (mL)
Mass	kilogram (kg)	gram (g)	milligram (mg)

### Exercise 11

Write large, small or base on the line. Check your work using the answer key at the end of the exercise.

- |                     |                     |
|---------------------|---------------------|
| a. kilometre ____.  | d. gram ____.       |
| b. millimetre ____. | e. litre ____.      |
| c. metre ____.      | f. millimetre ____. |

g. milligram \_\_\_\_.

i. centimetre \_\_\_\_.

h. kilogram \_\_\_\_.

**Answers to Exercise 11**

a. large

f. small

b. small

g. small

c. base

h. large

d. base

i. small

e. base

Exercise 12

Write the base unit of measure and then the prefix if one is needed. Check your work using the answer key at the end of the exercise.

	<b>Item</b>	<b>Base</b>	<b>Prefix (if needed)</b>
<b>a)</b>	Height of a tree		
<b>b)</b>	A bottle of vanilla		
<b>c)</b>	A cold tablet		
<b>d)</b>	Distance between Vancouver and Toronto		
<b>e)</b>	Thickness of a piece of paper		
<b>f)</b>	Length of your foot		
<b>g)</b>	Length of a piece of lumber		
<b>h)</b>	A bottle of hand lotion		
<b>i)</b>	A granola bar		
<b>j)</b>	Diameter of a DVD		
<b>k)</b>	Mass of a book		
<b>l)</b>	Water in a hot tub		
<b>m)</b>	Distance around the Earth		
<b>n)</b>	Gap in a spark plug		

**Answers to Exercise 12**

	Item	Base	Prefix (if needed)
a)	Height of a tree	m	
b)	A bottle of vanilla	L	milli
c)	A cold tablet	g	milli
d)	Distance between Vancouver and Toronto	m	kilo
e)	Thickness of a piece of paper	m	milli
f)	Length of your foot	m	centi
g)	Length of a piece of lumber	m	
h)	A bottle of hand lotion	L	milli
i)	A granola bar	g	
j)	Diameter of a DVD	m	centi
k)	Mass of a book	g	
l)	Water in a hot tub	L	
m)	Distance around the Earth	m	kilo
n)	Gap in a spark plug	m	milli

## Exercise 13

Write the unit of measure you would use for each item below. Check your work using the answer key at the end of the exercise.

- |  |                                       |
|--|---------------------------------------|
| a. Coffee in a cup – <b>millilitres (mL)</b> | h. Box of cereal                      |
| b. Bag of potatoes                           | i. Distance from Vancouver to Halifax |
| c. Gas for a car                             | j. Height of a child                  |
| d. Length of the hall                        | k. Can of soup                        |
| e. Vitamin C tablet                          | l. Window wash for the car            |
| f. Thickness of glass                        | m. Dose of heart medicine             |
| g. Width of a page                           | n. Length of a machine bolt           |

- o. Cheese

### Answers to Exercise 13

- |   |  |
|---|--|
| a. Coffee in a cup – millilitres (mL)   | i. Distance from Vancouver to Halifax – kilometre (km) |
| b. Bag of potatoes – kilogram (kg)      | j. Height of a child – metre (m)                       |
| c. Gas for a car – litre (L)            | k. Can of soup – millilitre (mL)                       |
| d. Length of the hall – metre (m)       | l. Window wash for the car – litre (L)                 |
| e. Vitamin C tablet – milligram (mg)    | m. Dose of heart medicine – milligram (mg)             |
| f. Thickness of glass – millimetre (mm) | n. Length of a machine bolt – millimetre (mm)          |
| g. Width of a page – centimetre (cm)    | o. Cheese – kilogram (kg)                              |
| h. Box of cereal – gram (g)             |  |

## Area of Rectangles and Squares

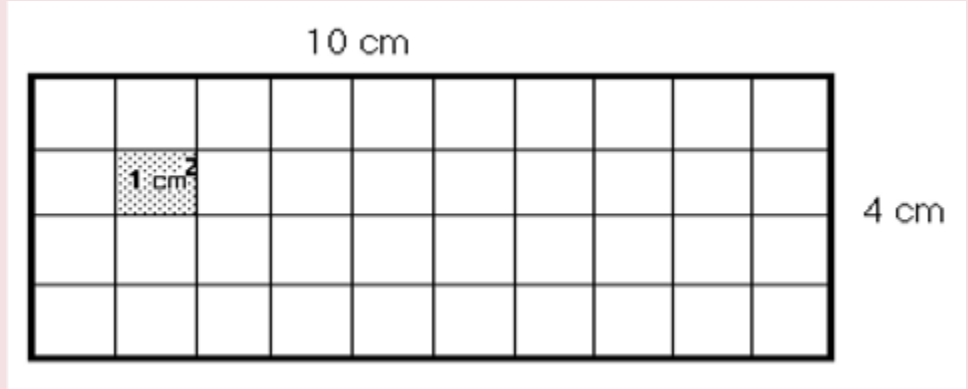
**Area** is the amount of surface within a figure. Area is described using *square units*.

For example,

- If the figure is a room, the **area** is the floor surface.
- If the figure is a tabletop, the area is the top surface of the table. If the figure is a roof, the area would be the shingled surface.
- If the figure is property, the area is the ground within the property lines.
- If the figure is this page, the area is the entire flat page that you are reading.

### Example A

Find the area of this rectangle.



The measurements of this rectangle are given in centimetres. To measure the area, we will use squares which are 1 cm by 1 cm ( **a square centimetre** ). How many square centimetres will fit on the surface of this rectangle? Count the 1 cm squares drawn within the Example A rectangle.

The area of this rectangle is \_\_\_\_ square centimetres.

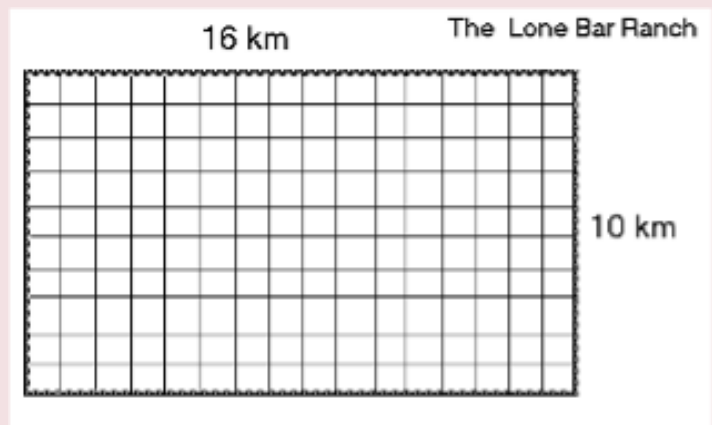
This is written as \_\_\_\_  $\text{cm}^2$

**Square centimetres** is usually written  $\text{cm}^2$  which is said as “square centimetres” or “centimetres squared”. The small number is called an *exponent* and if the exponent is 2, it means multiplied by itself, so  $\text{cm}^2$  means  $\text{cm} \times \text{cm}$ .

Square kilometres are written  $\text{km}^2$ . Square metres are written  $\text{m}^2$ .

### Example B

This is a diagram of a large cattle ranch. The measurements of the ranch are shown as kilometres. What is the area of this ranch?



The square units to measure will be **square kilometres**. The area of this ranch will be the number of units 1 km by 1 km ( $\text{km}^2$ ). The diagram shows how many square kilometres would fit in an area 16 km by 10 km. Count them. The area of the Lone Bar Ranch is \_\_\_\_  $\text{km}^2$ .



Did you find a quick method for counting the square units? Did you multiply the number of rows by the number of square kilometres in each row? The quick method of finding the area of a rectangle is to multiply the length by the width.

Use this formula **to find the area of a rectangle**:

$$\text{Area of a rectangle} = \text{length } (l) \times \text{width } (w)$$

*Length times width* can also be expressed as  $lw$ ,

$$\text{so } A_{\text{rectangle}} = lw$$

The answer **must** be expressed in square units.

### Example C

Give the area of a soccer field that is 100 m by 45 m.

$$A_{\text{rectangle}} = lw$$

$$\text{Area of the soccer field} = 100 \text{ m} \times 45 \text{ m} = 4500 \text{ m}^2$$

### Exercise 14

Find the area of the rectangles described below. The measures of the length ( $l$ ) and the width ( $w$ ) have been given. Draw and label a picture for each. Be sure to write the unit of measure for each answer. Check your work using the answer key at the end of the exercise.

- |   |  |
|---|--|
| a. $l = 10 \text{ cm}, w = 6 \text{ cm}$    | e. $l = 196 \text{ cm}, w = 28 \text{ cm}$ |
| b. $l = 100 \text{ km}, w = 70 \text{ km}$  | f. $l = 82 \text{ km}, w = 12 \text{ km}$  |
| c. $l = 400 \text{ km}, w = 100 \text{ km}$ | g. $l = 60 \text{ cm}, w = 250 \text{ cm}$ |
| d. $l = 975 \text{ cm}, w = 35 \text{ cm}$  | h. $l = 90 \text{ cm}, w = 2 \text{ cm}$   |

### Answers to Exercise 14

- |                         |                        |
|-------------------------|------------------------|
| a. $60 \text{ cm}^2$    | e. $5488 \text{ cm}^2$ |
| b. $7000 \text{ km}^2$  | f. $984 \text{ km}^2$  |
| c. $40000 \text{ km}^2$ | g. $1500 \text{ cm}^2$ |
| d. $34125 \text{ cm}^2$ | h. $180 \text{ cm}^2$  |

Squares are rectangles with all four sides congruent (the same length). So to find the area of a square you still use the same formula of multiplying the length times the width. But since the length and the width of a square are the same, you are multiplying the measure of the side ( $s$ ) by itself. The formula for finding the area of a square is often written using an exponent.

$$A_{\text{square}} = s^2$$

For example, to find the area of a square piece of property, multiply the length of one side by itself. If the measure of one side of a property is 75 m,

$$\text{Area of this piece of property: } 75^2 = 75 \text{ m} \times 75 \text{ m} = 5625 \text{ m}^2$$

### Exercise 15

Find the area of the squares. The measure of the side has been given. Draw and label a picture for each. Be sure to write the unit of measure for each answer. Check your work using the answer key at the end of the exercise.

- |  |   |
|--|---|
| a. $A_{\text{square}}$ , if $s = 5 \text{ cm}$   | d. $A_{\text{square}}$ , if $s = 100 \text{ m}$ |
| b. $A_{\text{square}}$ , if $s = 125 \text{ km}$ | e. $A_{\text{square}}$ , if $s = 14 \text{ km}$ |
| c. $A_{\text{square}}$ , if $s = 4 \text{ mm}$   | f. $A_{\text{square}}$ , if $s = 25 \text{ cm}$ |

### Answers to Exercise 15

- |                         |                        |
|-------------------------|------------------------|
| a. $25 \text{ cm}^2$    | d. $10000 \text{ m}^2$ |
| b. $15625 \text{ km}^2$ | e. $196 \text{ km}^2$  |
| c. $2025 \text{ mm}^2$  | f. $625 \text{ cm}^2$  |

## Problems Using Area

### Exercise 16

Do these problems by following the five problem solving steps. Be sure to draw a picture. Check your work using the answer key at the end of the exercise.

- A garden in the shape of a rectangle is 34 m long and 20 m wide. What is the area of the garden?
- Mr. Pavelski has a lot in the shape of a square. If the side of his square lot is 50 m, what is the

- area of the lot?
- A rectangular board is 58 cm wide and 64 cm long. How much area will this board
  - Kyoko bought some curtain material that is 198 cm long and 40 cm How many square centimetres of material did she buy
  - The distance between bases of a baseball diamond (a square) is 27 What is the area of the baseball diamond?
  - The janitor waxed the floor that was 24 m long and 18 m How many square metres of floor did he wax?

**Answers to Exercise 16**

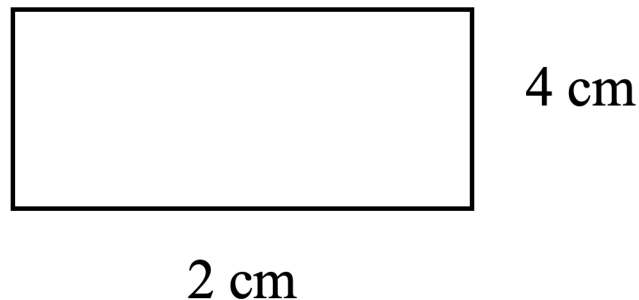
- |                        |                        |
|------------------------|------------------------|
| a. $680 \text{ m}^2$   | d. $7920 \text{ cm}^2$ |
| b. $2500 \text{ m}^2$  | e. $729 \text{ m}^2$   |
| c. $3712 \text{ cm}^2$ | f. $432 \text{ m}^2$   |

**Perimeter and Area of Rectangles and Squares****Rectangle**

**Perimeter** means **distance around**. To find the **perimeter** of a rectangle, use the formula

$$P = 2 \times \text{length} + 2 \times \text{width}.$$

## Example D



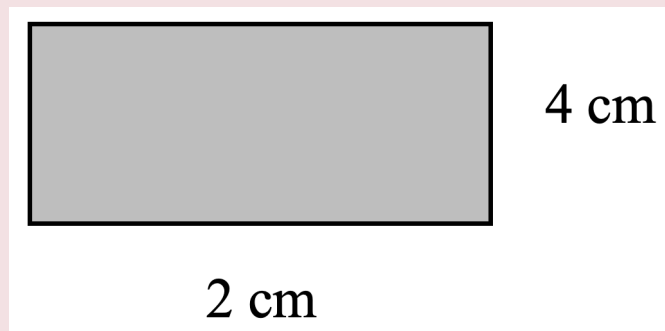
$$\begin{aligned}
 P &= 2 \times \text{length} + 2 \times \text{width} \\
 &= 2 \times 4 \text{ cm} + 2 \times 2 \text{ cm} \\
 &= 8 \text{ cm} + 4 \text{ cm} \\
 &= 12 \text{ cm}
 \end{aligned}$$

**Remember:** Multiply first and then add.

**Area** means **the amount of surface within a shape**. To find the **area** of a rectangle, use the formula

$$A = \text{length} \times \text{width}$$

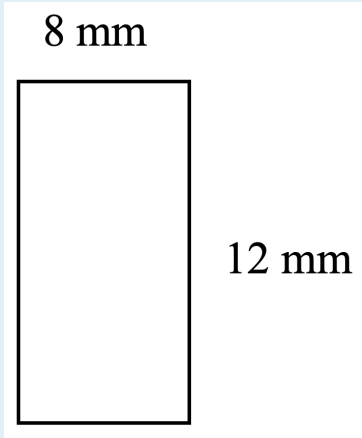
Example E



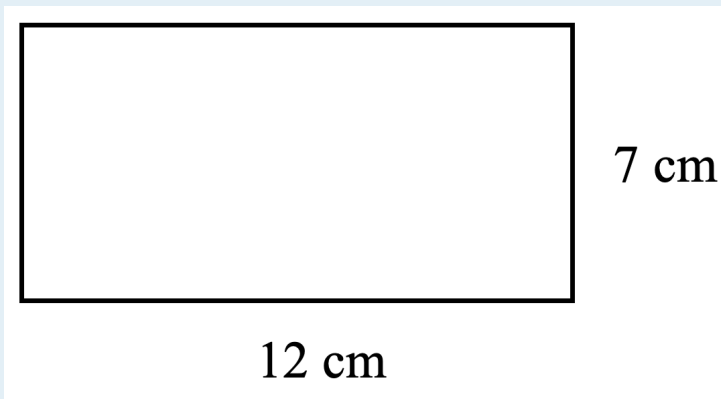
$$\begin{aligned}
 A &= \text{length} \times \text{width} \\
 &= 4 \text{ cm} \times 2 \text{ cm} \\
 &= 8 \text{ cm}^2
 \end{aligned}$$

Exercise 17

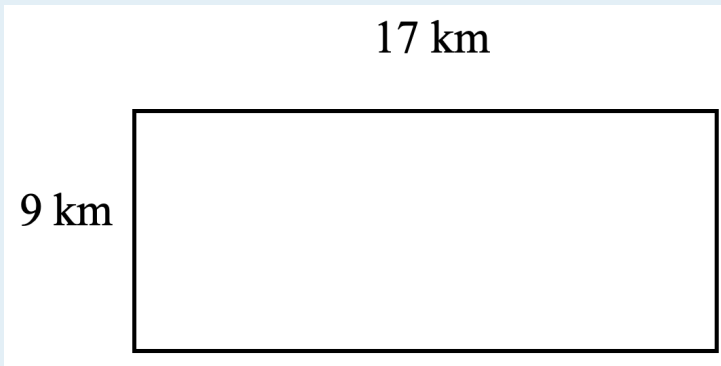
For each rectangle, find both the perimeter (distance around) and the area (amount of surface within). Check your work using the answer key at the end of the exercise.



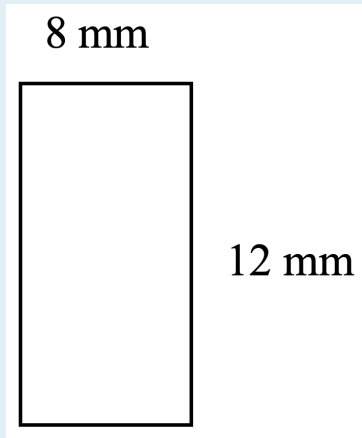
a.



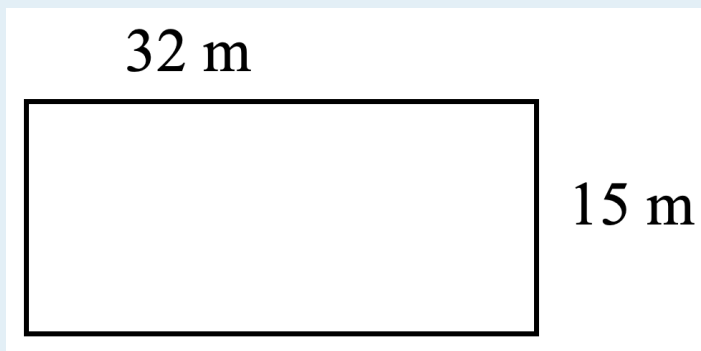
b.



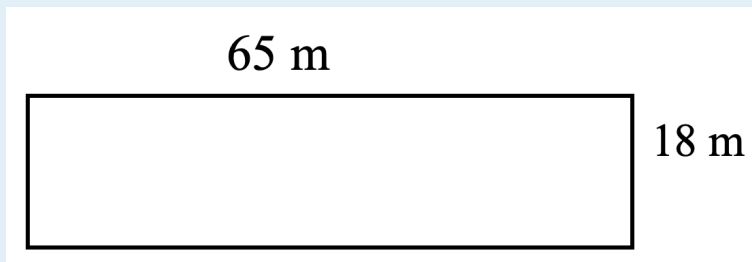
c.



d.



e.



f.

- g. Raoul's lot is shaped like a rectangle. If it is 55 m long and 15 m wide, what is the perimeter and area of his lot?
- h. The playground is shaped like a rectangle. Its length is 140 m and its width is 60. What is the perimeter and area of the playground?

**Answers to Exercise 17**

- |  |  |
|--|--|
| a. $P = 16 \text{ m}, A = 12 \text{ m}^2$    | e. $P = 94 \text{ m}, A = 480 \text{ m}^2$     |
| b. $P = 38 \text{ cm}, A = 84 \text{ cm}^2$  | f. $P = 166 \text{ m}, A = 1\,170 \text{ m}^2$ |
| c. $P = 52 \text{ km}, A = 153 \text{ km}^2$ | g. $P = 140 \text{ m}, A = 825 \text{ m}^2$    |
| d. $P = 40 \text{ mm}, A = 96 \text{ mm}^2$  | h. $P = 400 \text{ m}, A = 8\,400 \text{ m}^2$ |

**Square**

**Perimeter** means **distance around**. To find the **perimeter** of a square, use the formula

$$P = 4 \times \text{side} \text{ or } P_{\text{square}} = 4s$$

## Example F

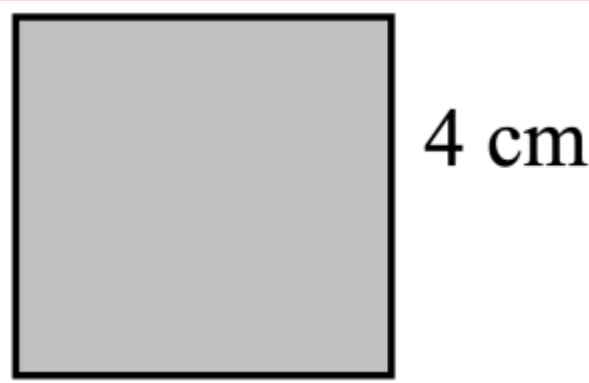


$$\begin{aligned} P &= 4 \times \text{side} \\ &= 4 \times 9 \text{ cm} \\ &= 36 \text{ cm} \end{aligned}$$

**Area** means **the amount of surface within a shape**. To find the **area** of a square, use the formula

$$A = \text{side}^2 \text{ or } A_{\text{square}} = s^2$$

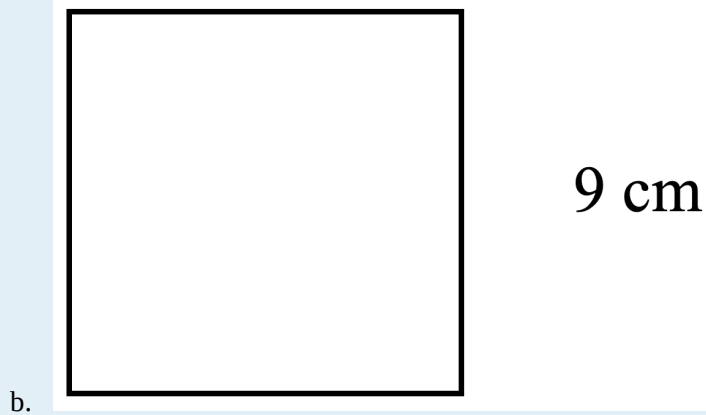
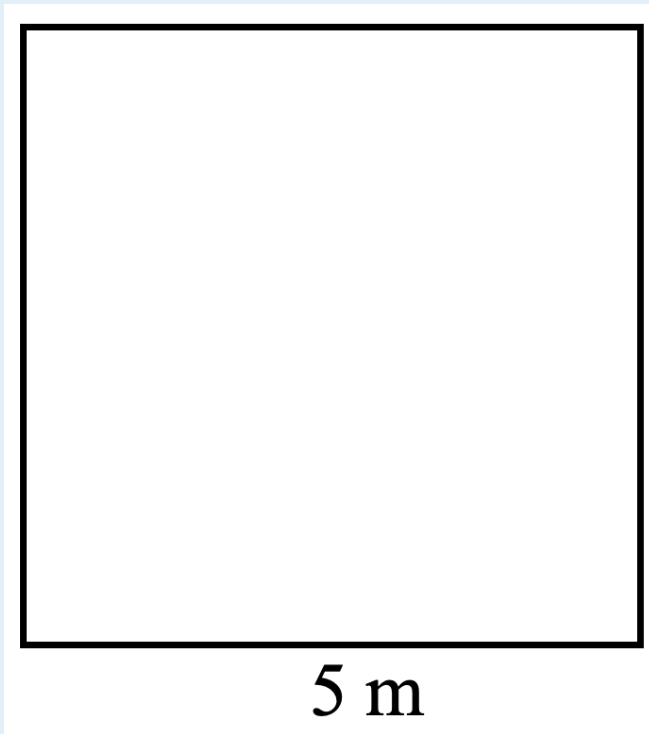
## Example G



$$\begin{aligned} A &= \text{side}^2 \\ &= (4 \text{ cm})^2 \\ &= 16 \text{ cm}^2 \end{aligned}$$

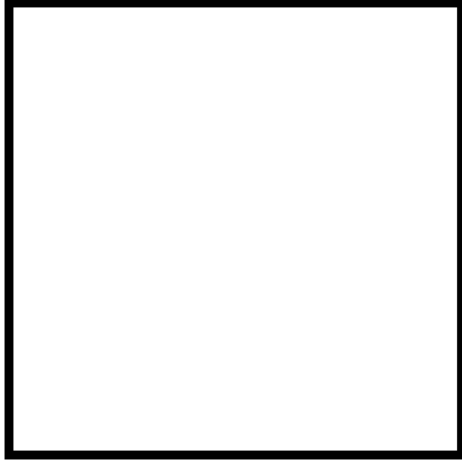
Exercise 18

For each square, find both the perimeter (distance around) and the area (amount of surface within). Check your work using the answer key at the end of the exercise.



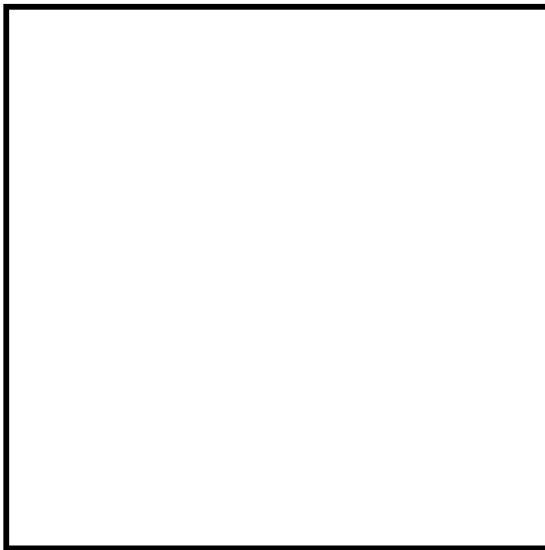


15 cm

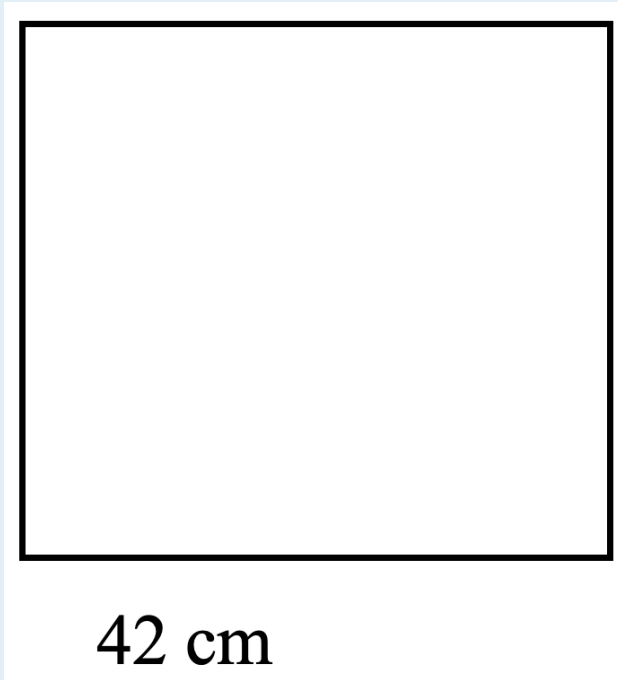


c.

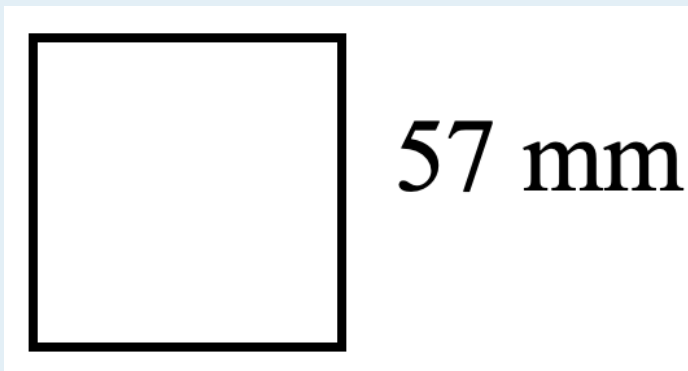
38 cm



d.



e.



f.

g. Luisa bought a 115 cm square tablecloth. What is the perimeter and area of the tablecloth?

h. Liang bought a square tarp whose side was 31 m. What is the perimeter and area of the tarp?

**Answers to Exercise 18**

a.  $P = 20 \text{ m}, A = 25 \text{ m}^2$

b.  $P = 36 \text{ cm}, A = 81 \text{ cm}^2$

c.  $P = 60 \text{ cm}, A = 255 \text{ cm}^2$

d.  $P = 152 \text{ cm}, A = 1\,444 \text{ cm}^2$

e.  $P = 168 \text{ cm}, A = 1\,764 \text{ cm}^2$

f.  $P = 288 \text{ mm}, A = 3\,249 \text{ mm}^2$

g.  $P = 460 \text{ cm}, A = 13\,225 \text{ cm}^2$

h.  $P = 124 \text{ m}, A = 961 \text{ m}^2$

## Topic C: Self Test

Mark /38 Aim 30/38

A. For each item, circle the unit of measure you would use. (8 marks)

	Item	Unit of Measure
a)	Height of a doorknob above the floor	m, cm, mm, km
b)	Thickness of a piece of wire	m, cm, mm, km
c)	Length of a ski	m, cm, mm, km
d)	Thickness of a piece of string	m, cm, mm, km
e)	Height of a fence	m, cm, mm, km
f)	Length of a finger	m, cm, mm, km
g)	Length of a football field	m, cm, mm, km
h)	How far you travelled on your holiday	m, cm, mm, km

B. Circle the letter of the most reasonable measure. (6 marks)

a. Storage box

- i. 66 mL
- ii. 66 L
- iii. 6 L

b. Baby Shampoo

- i. 593 mL
- ii. 593 L
- iii. 59 L

c. Antifreeze

- i. 40 L
- ii. 4 L
- iii. 40 mL

d. Wastebasket

- i. 42 mL
- ii. 4 L
- iii. 42 mL

e. Deodorant

- i. 354 L
- ii. 35 mL
- iii. 354 mL

f. Liquid laundry soap

- i. 975 mL
- ii. 97 L
- iii. 975 L

C. Circle the unit of measure you would use. (6 marks)

	Item	Unit of Measure
a)	Can of peanuts	mg, g, kg
b)	Cat litter	mg, g, kg
c)	An antacid tablet	mg, g, kg
d)	Bag of potato chips	mg, g, kg

D. Fill in the chart with the right metric prefix. (6 marks)

Small	Base	Large

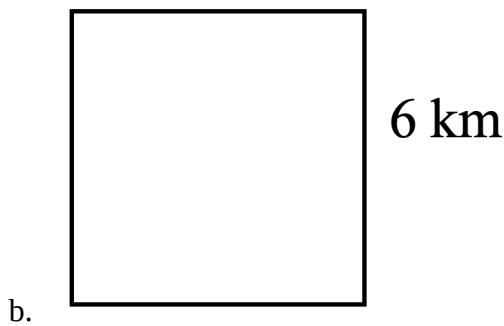
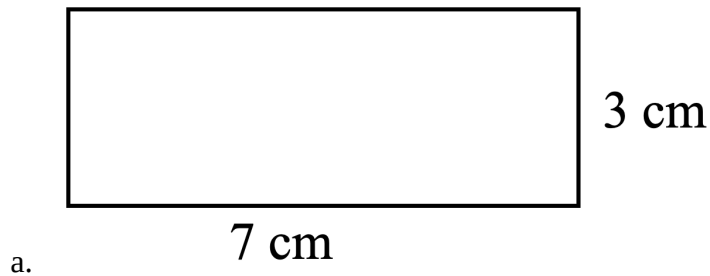
e. A fish

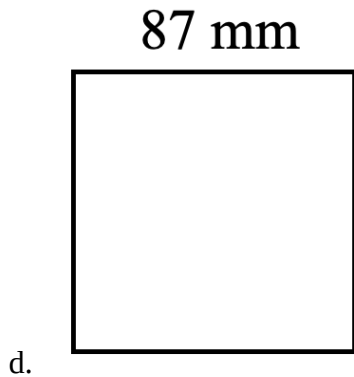
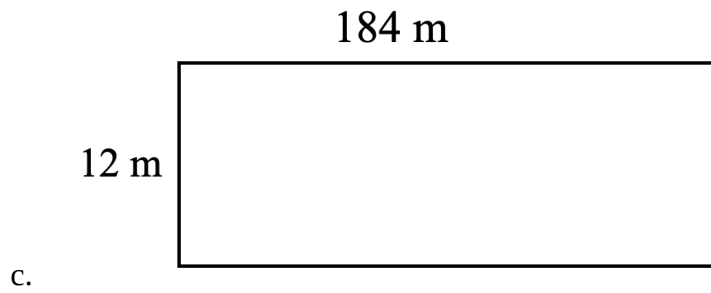
- i. 5g
- ii. 5 mg
- iii. 5 kg

f. A bar of soap

- i. 90 mg
- ii. 90 kg
- iii. 90 g

E. Find the perimeter and area for each shape. (12 marks)





- e. A double size bed cover measures 135 cm wide and 190 cm. What is the perimeter and area of the bed cover?
- f. An Olympic size swimming is 50 m long and 25 m wide. What is the perimeter and area of the swimming pool?

### Answers to Topic D Self-Test

- |       |            |
|-------|------------|
| a. cm | e. m or cm |
| b. mm | f. cm      |
| c. cm | g. m       |
| d. mm | h. km      |
| a. ii | d. ii      |
| b. i  | e. iii     |
| c. ii | f. i       |
| a. g  | d. g       |
| b. kg | e. iii     |
| c. mg | f. iii     |

B.

<b>Small</b>	<b>Base</b>	<b>Large</b>
milli	Litre	
milli	metre	kilo
milli	gram	kilo

a.  $P = 20 \text{ cm}, A = 21 \text{ cm}^2$

b.  $P = 24 \text{ km}, A = 26 \text{ km}^2$

c.  $P = 410 \text{ m}, A = 3\,864 \text{ m}^2$

d.  $P = 348 \text{ mm}, A = 7\,569 \text{ mm}^2$

e.  $P = 650 \text{ cm}, A = 25\,650 \text{ cm}^2$

f.  $P = 150 \text{ m}, A = 1\,250 \text{ m}^2$

## Unit 3 Review: Change and the Metric System

You will now practice all the skills you learned in Unit 3. Check your work using the answer key at the end of the review

- A. Circle the number of coins or bills you would need to get from the first number to the second number. Make sure to use the least number of coins or bills.

- a. \$48 to \$50



- b. \$59 to \$60



- c. \$73 to \$80



d. \$33 to \$40



B. State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible.

a. \$23 to \$25

c. \$85 to \$90

b. \$31 to \$35

d. \$70 to \$90

C. State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible.

a. **\$37 to \$50**

b. **\$53 to \$60**

Need	To get to

Need	To get to



c. **\$77 to \$100**

Need	To get to

d. **\$21 to \$50**

Need	To get to

D. State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible.

a. **\$63.54 to \$80**

Need	To get to

c. **\$20.31 to \$40**

Need	To get to

b. **\$32.63 to \$50**

Need	To get to

d. **\$72.18 to \$100**

Need	To get to

E. State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible.



- a. printer for \$78.36



- b. cordless phone for \$55.65

- c. Mrs. Kono bought a new cordless kettle for \$44.78. How much change will Mrs. Kono get from \$100?

F. Circle the letter of the most reasonable measure.

- a. Diameter of a hockey puck

- i. 76 mm
- ii. 76 m
- iii. 76 cm

- c. Thickness of a blanket

- i. 10 m
- ii. 10 cm
- iii. 10 mm

- b. Distance from the mall to home

- i. 10 km
- ii. 10 m
- iii. 10 cm

- d. Height of a tree

- i. 28 mm
- ii. 28 m
- iii. 28 cm

G. Choose the most reasonable measure.

- a. Carlos drinks

- i. 500 L of milk
- ii. 500 mL of milk
- iii. 5 mL of milk

- b. A thermos holds

- i. 360 mL
- ii. 360 L
- iii. 36 L

- c. A swimming pool holds 3758 \_\_\_\_ of water

- d. A tube of lotion is 50 \_\_\_\_.

H. Choose the most reasonable measure.

- a. A dog weighs
- 17 g
  - 17 kg
  - 17 mg
- b. A nickel has a mass of
- 5 g
  - 5 mg
  - 5 kg
- c. A paper clip has mass of
- 1 kg
  - 1 mg
  - 1 g
- d. Six math books have mass of
- 2 kg
  - 2 mg
  - 2 g
- e. Elena took 400 \_\_\_\_ of vitamin A
- f. Suki bought 10 \_\_\_\_ of potatoes

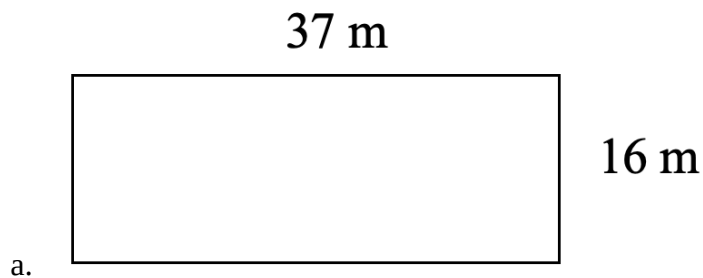
I. Write the base unit of measure and then the prefix if one is needed.

	Item	Base	Prefix (if needed)
a)	Length of a garden hose		
b)	A bottle of olive oil		
c)	A child's multivitamin		
d)	Distance between Jupiter and Mars		
e)	Thickness of a kleenex		

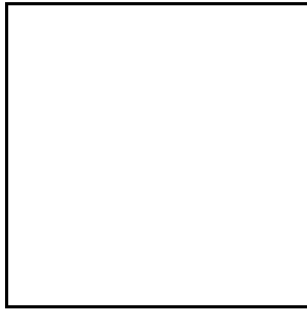
J. Write the unit of measure you would use for each item below.

- Paint thinner
- Cat litter
- Deodorant
- Length of the street
- Aspirin

K. Find the area of each shape.

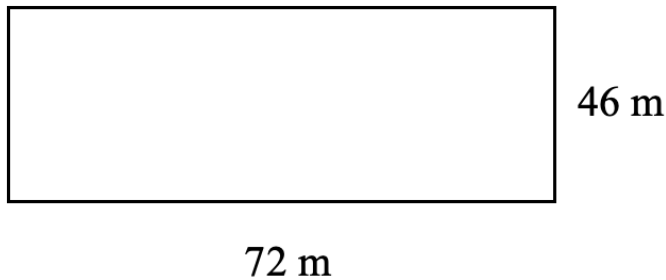


82 cm



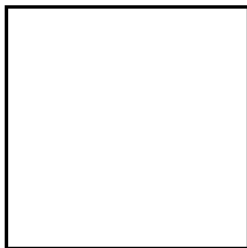
- b.
- c. Red Square in Moscow measures 330 m long and 70 m wide. What is the area of Red Square?
- d. Yoshiro is going to build a square patio whose side is 23 What is the area of the patio?

L. Find the perimeter and area of each shape.



a.

39 mm



- b.
- c. Nadal wants to fence his garden. It is 15 m wide and 26 m long. How much fencing does Nadal need? How much space does Nadal have to plant a garden?
- d. Yolanda would like to buy fencing and sod for her new lawn that is 54 m long and 42 m wide. How much fencing does she need? How much sod does she need?

### Answers to Unit 3 Review

A. Circle the number of coins or bills you would need.

a. 1 toonie

b. 1 loonie

c. 1 toonie, 1 \$5 bill

d. 1 toonie, 1 \$5 bill

B. State the number and kind of coins and bills you would need.

A. 1 toonie

C. 1 \$5 bill

B. 2 toonies

D. 1 \$20 bill

C. State the number and kind of coins and bills you would need.

a. **\$37 to \$50**

Need	To get to
1 loonie	\$38
1 toonie	\$40
1 \$10 bill	\$50

c. **\$77 to \$100**

Need	To get to
1 loonie	\$78
1 toonie	\$80
1 \$20 bill	\$100

b. **\$53 to \$60**

Need	To get to
1 toonie	\$55
1 \$5 bill	\$60

d. **\$21 to \$50**

Need	To get to
2 toonies	\$25
1 \$5 bill	\$30
1 \$20 bill	\$50

D. State the number and kind of coins and bills you would need.

a. **\$63.54 to \$80**

Need	To get to
1 penny	\$63.55
2 dimes	\$63.75
1 quarter	\$64
1 loonie	\$65
1 \$5 bill	\$70
1 \$10 bill	\$80

b. **\$32.63**

Need	To get to
4 pennies	\$20.35
1 nickel	\$20.40
1 dime	\$20.50
2 quarters	\$21
2 toonies	\$25
1 \$5 bill	\$30
1 \$10 bill	\$40

c. **\$20.31 to \$40**

Need	To get to
2 pennies	\$32.65
1 dime	\$32.75
1 quarter	\$33
1 toonie	\$35
1 \$5 bill	\$40
1 – \$10	\$50

d. **\$72.18 to \$100**

Need	To get to
2 pennies	\$72.20
1 nickel	\$72.25
3 quarters	\$73
1 toonie	\$75
1 \$5 bill	\$80
1 \$20 bill	\$100

E. State the number and kind of coins and bills you would need.

- a. 4 pennies, 1 dime, 2 quarters, 1 loonie, 1 \$20 bill
- b. 1 dime, 1 quarter, 2 toonies, 2 \$20 bill
- c. 2 pennies, 2 dimes, 1 \$5 bill, 1 \$10 bill, 2 \$20 bill

F. Circle the letter of the most reasonable measure.

- a. i
- b. i
- c. iii
- d. ii

G. Choose the most reasonable measure.

- a. ii
- b. ii
- c. L
- d. mL

H. Choose the most reasonable measure.

- a. ii
- b. i
- c. iii
- d. i
- e. mg
- f. kg

I. Write the base unit of measure and then the prefix if one is needed.

	Item	Base	Prefix (if needed)
a)	Length of a garden hose	m	
b)	A bottle of olive oil	L	milli
c)	A child’s multivitamin	g	milli
d)	Distance between Jupiter and Mars	m	kilo
e)	Thickness of a kleenex	m	milli

J. Write the unit of measure you would use for each item below.

- a. Paint thinner
- b. Cat litter
- c. Deodorant
- d. Length of the street
- e. Aspirin

K. Find the area of each shape.

- a.  $A = 592 \text{ m}^2$
- b.  $A = 6724 \text{ cm}^2$
- c.  $A = 23100 \text{ m}^2$
- d.  $A = 529 \text{ m}^2$

L. Find the perimeter and area of each shape.

- a.  $P = 236 \text{ m}, A = 3312 \text{ m}^2$
- b.  $P = 156 \text{ mm}, A = 1521 \text{ mm}^2$
- c.  $P = 82 \text{ m}, A = 390 \text{ m}^2$
- d.  $P = 192 \text{ m}, A = 2268 \text{ m}^2$





## Book 3 Review

You will now practice all the skills you learned in Book 3. Check your work using the answer key at the end of the review.

**If you can't remember how to do a question,** go back to the lesson on this topic to refresh your memory. The unit and topic for each question is listed.

Example: **1-B** means Unit 1, Topic B

### Book 3 Review Questions

#### 1-A

A. Find the products.

$$\begin{array}{r} \text{a.} \quad 4 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 9 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} \text{g.} \quad 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 7 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 6 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} \text{h.} \quad 5 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 2 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 0 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{i.} \quad 10 \\ \times 10 \\ \hline \end{array}$$

#### 1-B

B. Find the products.

$$\begin{array}{r} \text{a.} \quad 71 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 623 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 8431 \\ \times \quad 2 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 5231 \\ \times \quad 3 \\ \hline \end{array}$$

C. Find the products.

$$\begin{array}{r} \text{a.} \quad 68 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 9346 \\ \times \quad 7 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 457 \\ \times \quad 6 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 1329 \\ \times \quad 4 \\ \hline \end{array}$$

D. Find the products.

$$\begin{array}{r} \text{a.} \quad 45 \\ \times \quad 26 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d.} \quad 463 \\ \times \quad 179 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 542 \\ \times \quad 38 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e.} \quad 6314 \\ \times \quad 231 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 3829 \\ \times \quad 52 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f.} \quad 1425 \\ \times \quad 537 \\ \hline \end{array}$$

E. Find the products. Use the shortcut.

$$\begin{array}{r} \text{a.} \quad 1000 \\ \times \quad 792 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b.} \quad 9264 \\ \times \quad 100 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c.} \quad 1000 \\ \times \quad 85 \\ \hline \end{array}$$

$$\text{e. } 100 \times 259 =$$

$$\text{d. } 3609 \times 10 =$$

$$\text{f. } 10 \times 46 =$$

$$\text{g. } 5719 \times 1000 =$$

### 1-C

F. Find an estimated product.

$$\text{a.} \quad \begin{array}{r} 72 \\ \times 38 \\ \hline \end{array}$$

$$\text{d.} \quad \begin{array}{r} 792 \\ \times 901 \\ \hline \end{array}$$

$$\text{b.} \quad \begin{array}{r} 574 \\ \times 83 \\ \hline \end{array}$$

$$\text{e.} \quad \begin{array}{r} 8560 \\ \times 193 \\ \hline \end{array}$$

$$\text{c.} \quad \begin{array}{r} 5492 \\ \times 87 \\ \hline \end{array}$$

$$\text{f.} \quad \begin{array}{r} 29492 \\ \times 585 \\ \hline \end{array}$$

### 1-D

G. Word Problems.

- The Great Belt Suspension Bridge in Denmark is 1 624 metres How many metres will 24 trucks travel crossing the bridge?
- How many cans of peaches are needed to pack 300 boxes if each box has 3 rows and each row has 6 cans? (2 step question)
- The Krubera Cave in Georgia is the deepest cave in the world at 2 191 metres.

Estimate how many metres 348 visitors will cover going down to the cave.

**2-A**

H. Complete this chart.

	<b>Multiplication</b>	<b>Division</b>	<b>Division</b>	<b>“Say”</b>
a)	$3 \times 8 = 24$ $8 \times 3 = 24$	$24 \div 8 = 3$ $24 \div 3 = 8$	$\begin{array}{r} 3 \\ 8 \overline{)24} \\ \underline{24} \\ 0 \end{array}$ $\begin{array}{r} 8 \\ 3 \overline{)24} \\ \underline{24} \\ 0 \end{array}$	“24 divided by 8 is 3” “24 divided by 3 is 8”
b)	$7 \times 5 = 35$			
c)	$9 \times 3 = 27$			

I. Give the answer.

a.  $28 \div 4 =$

c.  $64 \div 8 =$

e.  $5 \overline{)40}$

b.  $18 \div 6 =$

d.  $9 \overline{)81}$

f.  $3 \overline{)32}$

J. Find the quotients.

a.  $8 \overline{)60}$

c.  $9 \overline{)43}$

b.  $5 \overline{)49}$

d.  $3 \overline{)19}$

**2-B**

K. Using the following list of numbers, answer questions a, b, c and d. **96, 345, 3 816, 6 815, 38 433, 95 373**

- Which numbers are divisible by 2?
- Which numbers are divisible by 3?
- Which numbers are divisible by 5?
- Which numbers are divisible by 9?

**2-C**

L. Find the quotients.

a.  $3 \overline{)963}$

c.  $4 \overline{)844}$

b.  $2 \overline{)682}$

d.  $5 \overline{)550}$

M. Find the quotients.

a.  $9 \overline{)387}$

c.  $5 \overline{)915}$

b.  $6 \overline{)492}$

d.  $7 \overline{)469}$

N. Find the quotients.

a.  $8 \overline{)832}$

c.  $3 \overline{)927}$

b.  $4 \overline{)836}$

d.  $2 \overline{)416}$

O. Find the quotients.

a.  $5 \overline{)92}$

b.  $7 \overline{)86}$

c.  $4\overline{)73}$

d.  $6\overline{)91}$

P. Find the quotients.

a.  $3\overline{)851}$

c.  $2\overline{)407}$

b.  $8\overline{)509}$

d.  $7\overline{)954}$

**2-D**

Q. Find the quotients.

a.  $24\overline{)480}$

c.  $36\overline{)1944}$

b.  $58\overline{)928}$

d.  $73\overline{)37668}$

R. Find the quotients.

a.  $10\overline{)683}$

c.  $100\overline{)13041}$

b.  $1000\overline{)41839}$

d.  $1000\overline{)63125}$

S. Find the quotients.

a.  $348\overline{)8010}$

c.  $753\overline{)619345}$

b.  $483\overline{)27150}$

d.  $73\overline{)37668}$

**2-E**

T. Give an estimated quotient. Show your rounding where needed.

a.  $30 \overline{)63000}$

d.  $438 \overline{)23689}$

b.  $7000 \overline{)8400000}$

e.  $768 \overline{)63875}$

c.  $58 \overline{)2894}$

f.  $896 \overline{)80986}$

**2-F**

U. Word problems.

- A satellite orbits the moon every 58 minutes. How many complete orbits does it make 6 728 minutes?
- If it takes 73 hours to make a snow blower. How many snow blowers can be made in 47 815 hours?
- There were 10 780 tickets sold at the game. There were 150 tickets in each roll. How many complete rolls of tickets were used? How many were sold from the next roll?

V. Solve the cost per unit price.

a. 6 packages of rice for \$12

b. 2 tubs of yogurt for \$8

W. Solve the unit price and then underline the best buy.

- Dog food  
8 kilograms for \$16 or 15 kilograms for \$45
- Movies  
9 movies for \$162 or 3 movies for \$48

**3-B**

X. Circle the number of coins or bills you would need to get from the first number to the second number. Make sure to use the least number of coins or bills.

a. \$58 to \$60



b. \$41 to \$50



c. \$78 to \$90



Y. State the number and kind of coins and bills you would need to get from the first number to the second number. Make sure you use the least number of coins and bills as possible.

- a. \$38 to \$40
- b. \$21 to \$40
- c. \$76 to \$100

Z. State the number and kind of coins and bills you would need to get change from the second number. Make sure you use the least number of coins and bills as possible.



a. **\$43 to \$100**

Need	To get to

c. **\$58.37 to \$100**

Need	To get to

b. **\$23 to \$80**

Need	To get to

d. **\$62.71 to \$100**

Need	To get to

AA. State the number and kind of coins and bills you would need to get change from \$100. Make sure you use the least number of coins and bills as possible.



a. Bread maker for \$61.59



b. Shop vacuum cleaner for \$84.43

c. Mrs. Chui bought building blocks for \$33.44. How much change will she get from \$100?

**3-C**

AB. Circle the letter of the most reasonable measure.

- |   |  |
|---|--|
| <p>a. Depth of the ocean</p> <p>i. 3 926 mm</p> <p>ii. 3 926 km</p> <p>iii. 3 926 m</p> | <p>c. Distance from the earth to moon</p> <p>i. 3 476 m</p> <p>ii. 3 476 mm</p> <p>iii. 3 476 km</p> |
| <p>b. Thickness of string</p> <p>i. 5 mm</p> <p>ii. 5 cm</p> <p>iii. 5 m</p>            | <p>d. Length of a banana</p> <p>i. 15 km</p> <p>ii. 15 mm</p> <p>iii. 15 cm</p>                      |

AC. Choose the most reasonable measure.

- |  |   |
|--|---|
| <p>a. A spoonful of medicine</p> <p>i. 5 L</p> <p>ii. 5 mL</p> <p>iii. 50 mL</p> | <p>b. A bottle of orange juice</p> <p>i. 4 mL</p> <p>ii. 4 L</p> <p>iii. 40 L</p> |
|--|---|
- c. A tube of toothpaste holds 130 \_\_\_\_.
- d. The gas tank of a car holds 70 \_\_\_\_.

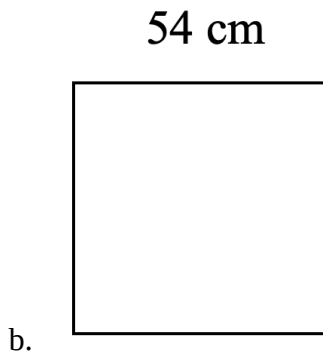
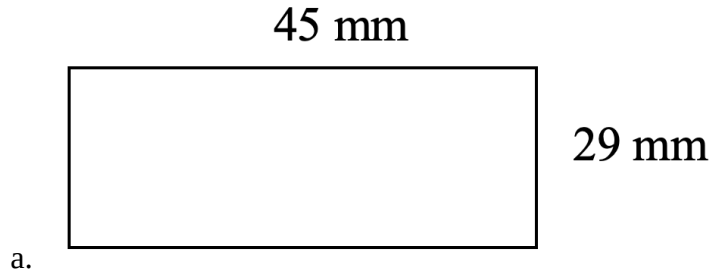
AD. Choose the most reasonable measure.

- |  |   |
|--|---|
| <p>a. A sugar cube has a mass of</p> <p>i. 1 g</p> <p>ii. 10 g</p> <p>iii. 10 kg</p> | <p>b. A cat weighs</p> <p>i. 7 mg</p> <p>ii. 7 kg</p> <p>iii. 7 g</p> |
|--|---|
- c. A headache pill has 375 \_\_\_\_ of medicine

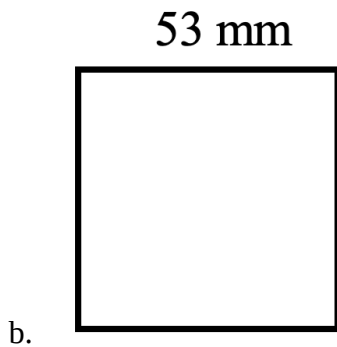
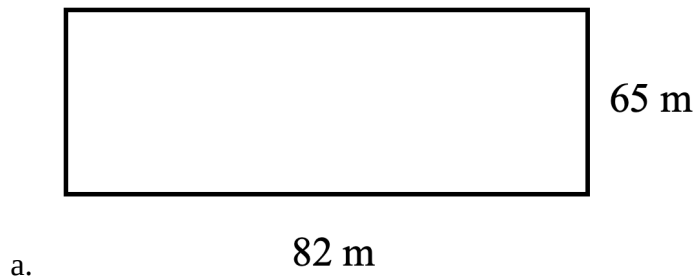
AE. Write the base unit of measure and then the prefix if one is needed.

	Item	Base	Prefix (if needed)
a)	Thickness of a rope		
b)	Water in a bathtub		
c)	A bag of rice		
d)	Length of a table		

AF. Find the area of each shape.



AG. Find the perimeter and area of each shape



- c. Tiananmen Square measures 880 metres by 500 metres Find the perimeter and area of Tiananmen
- d. Andr e wants to build a square patio whose side is 13 Find the perimeter and area of her new patio.

**Answers to Book 3 Review**

- A.            a. 36                                  d. 45                                  g. 32  
                  b. 56                                  e. 60                                  h. 10  
                  c. 12                                  f. 0                                      i. 100
- B.            a. 213    c. 16 862  
                  b. 1 869                                        d. 15 693
- C.            a. 340                                         c. 65 422  
                  b. 2 742                                        d. 5 316
- D.            a. 1 170                                        c. 199 108  
                  b. 20 596                                      d. 82 877
- E.            a. 792 000                                    e. 25 900  
                  b. 926 400                                    f. 460  
                  c. 85 000                                     g. 5 719 000  
                  d. 36 090
- F.            a.  $70 \times 40 = 2800$                               d.  $800 \times 900 = 720000$   
                  b.  $600 \times 80 = 48000$                             e.  $9000 \times 200 = 1800000$   
                  c.  $5000 \times 90 = 450000$                         f.  $30000 \times 600 = 18000000$
- G.            a. 38 976 metres                              c. 600 000 metres  
                  b. 5 400 cans

H.	Multiplication	Division	Division	“Say”
a)	$3 \times 8 = 24$ $8 \times 3 = 24$	$24 \div 8 = 3$ $24 \div 3 = 8$	$\begin{array}{r} 3 \quad 8 \\ 8 \overline{)24} \quad 3 \overline{)24} \end{array}$	“24 divided by 8 is 3” “24 divided by 3 is 8”
b)	$7 \times 5 = 35$ $5 \times 7 = 35$	$35 \div 5 = 7$ $35 \div 7 = 5$	$\begin{array}{r} 7 \quad 5 \\ 5 \overline{)35} \quad 7 \overline{)35} \end{array}$	“35 divided by 5 is 7” “35 divided by 7 is 5”
c)	$9 \times 3 = 27$ $3 \times 9 = 27$	$27 \div 3 = 9$ $27 \div 9 = 3$	$\begin{array}{r} 9 \quad 3 \\ 3 \overline{)27} \quad 9 \overline{)27} \end{array}$	“27 divided by 3 is 9” “27 divided by 9 is 3”

- I. a. 7 d. 9  
b. 3 e. 8  
c. 8 f. 7
- J. a. 7 R4 c. 4 R7  
b. 9 R4 d. 6 R1
- K. a. 96, 3 816 c. 345, 6 815  
b. 96, 345, 3 816, 38 433, 95 373 d. 3 816, 95 373
- L. a. 321 c. 211  
b. 341 d. 110
- M. a. 43 c. 183  
b. 82 d. 67
- N. a. 104 c. 309  
b. 209 d. 208
- O. a. 18 R2 c. 18 R1  
b. 12 R2 d. 15 R1
- P. a. 283 R2 c. 203 R1  
b. 63 R5 d. 136 R2
- Q. a. 20 b. 16

c. 54 d. 516

R. a. 68 R3 c. 130 R41  
 b. 418 R839 d. 63 R125

S. a. 23 R6 c. 822 R379  
 b. 56 R102 d. 516

T. a. 2100 d.  $24000 \div 400 = 60$   
 b. 1200 e.  $64000 \div 800 = 80$   
 c.  $30000 \div 60 = 50$  f.  $81000 \div 900 = 90$

U. a. 116 orbits  
 b. 655 snow blowers  
 c. 71 full rolls, 130 tickets

V. a. \$2 b. \$4

W. a. \$2, \$3, best buy is 8 kilograms for \$16  
 b. \$18, \$16, best buy is 3 movies for \$48

X. a. 1 toonie c. 1 toonie, 1 \$10 bill  
 b. 2 toonies, 1 \$5 bill

Y. a. 1 toonie c. 2 toonies, 1 \$20 bill  
 b. 2 toonies, 1 \$5 bill, 1 \$10 bill

Z. a. **\$43 to \$100** b. **\$23 to \$80**

Need	To get to
1 toonie	\$45
1 \$5 bill	\$50
1 \$10 bill	\$60
2 \$20 bills	\$100

Need	To get to
1 toonie	\$25
1 \$5 bill	\$30
1 \$10 bill	\$40
2 \$20 bill	\$80

c. **\$58.37 to \$100**

Need	To get to
3 pennies	\$58.40
1 dime	\$58.50
2 quarters	\$59.00
1 loonie	\$60.00
2 \$20 bill	\$100.00

d. **\$62.71 to \$100**

Need	To get to
4 pennies	\$62.75
1 quarter	\$63.00
1 toonie	\$65.00
1 \$5 bill	\$70.00
1 \$10 bill	\$80.00
1 \$20 bill	\$100.00

- AA. a. 1 penny, 1 nickel, 1 dime, 1 quarter, 1 loonie, 1 toonie, 1 \$5 bill, 1 \$10 bill, 1 \$20 bill  
 b. 2 pennies, 1 nickel, 2 quarters, 1 \$5 bill,
- AB. a. iii  
 b. i
- AC. a. ii  
 b. ii
- AD. a. i  
 b. ii
- c. 1 \$10 bill  
 c. 1 penny, 1 nickel, 2 quarters, 1 loonie, 1 \$5 bill, 3 \$20 bill  
 c. iii  
 d. iii  
 c. mL  
 d. L  
 c. mg

AE.

	Item	Base	Prefix (if needed)
a)	Thickness of a rope	m	m
b)	Water in a bathtub	L	
c)	A bag of rice	g	k
d)	Length of a table	m	c

- AF. a.  $1305 \text{ mm}^2$  b.  $2916 \text{ cm}^2$
- AG. a.  $P = 294 \text{ m}, A = 5330 \text{ m}^2$  c.  $P = 2760 \text{ m}, A = 440000 \text{ m}^2$   
 b.  $P = 212 \text{ mm}, A = 2809 \text{ mm}^2$  d.  $P = 52 \text{ m}, A = 169 \text{ m}^2$





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## Glossary

### **addends**

The numbers to be added together in an addition question. In  $3 + 5 = 8$ , the addends are 3 and 5.

### **axis**

Any straight line used for measuring or as a reference.

### **balance**

Balance has many meanings. In money matters, the balance is the amount left. It might be the amount left in a bank account (bank balance) or it might be the amount you still must pay on a bill (balance owing).

### **cancelled cheque**

A cheque that has been cashed. The cheque is stamped, or cancelled, so it is no longer negotiable.

### **circumference**

The distance around a circle; the perimeter of a circle.

### **commission**

Salespeople may be paid a percentage of the money made in sales. The commission is part or all of their earnings.

### **common fractions**

e.g.,  $\frac{2}{3}$ ,  $\frac{3}{7}$ ,  $\frac{49}{50}$

### **cross multiply**

In a proportion, multiply the numerator of the first fraction times the denominator of the second fraction. Then multiply the denominator of the first fraction times the numerator of the second fraction. In a true proportion, the products of the cross multiplication are equal.

### **denominator**

The bottom number in a common fraction; tells into how many equal parts the whole thing has been divided.

**diameter**

The distance across a circle through its centre.

**difference**

The result of a subtraction question, the answer. Subtraction gives the difference between two numbers.

**digit**

Any of the ten numerals (0 to 9) are digits. This term comes from our ten fingers which are called digits. The numerals came to be called "digits" from the practice of counting on the fingers!

**discount**

An amount taken off the regular cost. If something is bought "at a discount" it is bought at less than the regular price.

**divide**

To separate into equal parts.

**dividend**

The number or quantity to be divided; what you start with before you divide.

**divisor**

The number of groups or the quantity into which a number (the dividend) is to be separated.

**equal (=)**

The same as

**equation**

A mathematical statement that two quantities are equal. An equation may use numerals with a letter to stand for an unknown quantity.  $6 + Y = 9$

**equivalent**

Equal in value; equivalent numbers (whole or fractions) can be used interchangeably; that is, they can be used instead of each other.

**estimate**

Make an approximate answer. Use the sign  $\approx$  to mean approximately equal.

**factors**

The numbers or quantities that are multiplied together to form a given product.  $5 \times 2 = 10$ , so 5 and 2 are factors of 10.

**fraction**

Part of the whole; a quantity less than one unit.

**horizontal**

In a flat position, e.g. we are horizontal when we lie in a bed. A horizontal line goes across the page.

**improper fraction**

A common fraction with a value equal to or more than one.

**infinite**

Without end, without limit.

**invert**

To turn upside down.

**like fractions**

With the same denominators.

**lowest terms**

When the terms of a common fraction or ratio do not have a common factor (except 1), the fraction or ratio is in lowest terms (also called simplest form).

**minuend**

The first number in a subtraction question.

**mixed decimal**

A whole number and a decimal fraction. 1.75

**mixed number**

A whole number and a common fraction.  $1 \frac{3}{4}$

**multiple**

If a certain number is multiplied by another number, the product is a multiple of the numbers. Think of the multiplication tables. For example, 2, 4, 6, 8, 10, 12, 14... are multiples of 2.

**multiplicand**

The number to be multiplied.

**multiplier**

The number you multiply by.

**negotiable**

Something which can be cashed, that is, exchanged or traded as money.

**numbers**

Numbers represent the amount, the place in a sequence; *number* is the idea of quantity or order.

**numerals**

The digits 1, 2, 3, 4, 5, 6, 7, 8, 9, 0 are also called numerals. These ten digits are combined to make infinite numerals. Digits are like letters, numerals are like words, and numbers are the meaning.

**numerator**

The top number in a common fraction; the numerator tells how many parts of the whole thing are being considered.

**overdrawn**

If the value of the cheques or money taken from a bank account is higher than the amount of money in the account, then the account is overdrawn. The account is "in the hole" or "in the red" are expressions sometimes used.

**parallel**

Two objects or lines side by side, never crossing and always the same distance from each other. Railway tracks are parallel, the lines on writing paper are parallel.

**percent (%)**

For every one hundred.

**perimeter**

The distance around the outside of a shape.

**place value**

We understand numbers by the way the digits (numerals) are arranged in relationship to each other and to the decimal point. Each position has a certain value. Our number system is a **decimal system**. The place value is based on **ten**.

**prime number**

A number that can only be divided evenly by itself and 1.

**product**

The result of a multiplying question, the answer.

**proper fraction**

A common fraction with a value less than one.

**proportion**

Generally, proportion is a way of comparing a part of something to the whole thing. E.g., his feet are small in proportion to his height. In mathematics, proportion is used to describe two or more ratios that are equivalent to each other.

**quotient**

The result of a division question; the quotient tells how many times one number is contained in the other.

**radius**

The distance from the centre of a circle to the outside of the circle.

**ratio**

The relationship between two or more quantities. E.g., the ratio of men to women in the armed forces is 10 to 3 (10:3)

**reciprocal**

A number, when multiplied by its reciprocal, equals 1. To find the reciprocal of a common fraction, invert it.  $\frac{3}{5} \times \frac{5}{3} = 1$

**reduce**

Write a common fraction in lowest terms. Divide both terms by same factor.

**remainder**

The amount left when a divisor does not divide evenly into the dividend. The remainder must be less than the divisor.

**sign**

In mathematics, a symbol that tells what operation is to be performed or what the relationship is between the numbers.

- + plus, means to add
- minus, means to subtract
- × multiplied by, "times"
- ÷ divided by, division
- = equal, the same quantity as
- ≠ not equal
- ≈ approximately equal
- < less than
- > greater than
- ≤ less than or equal to
- ≥ greater than or equal to

**simplify**

See *reduce*.

**subtrahend**

The amount that is taken away in a subtraction question.

**sum**

The result of an addition question, the answer to an addition question.

**symbol**

A written or printed mark, letter, abbreviation etc. that stands for something else.

**term**

- a) A definite period of time, such as a school term or the term of a loan.
- b) Conditions of a contract; the terms of the agreement.
- c) In mathematics, the quantities in a fraction and in a ratio are called the *terms* of the fraction or

the *terms* of the ratio. In an algebra equation, the quantities connected by a + or – sign are also called terms.

**total**

The amount altogether.

**transaction**

One piece of business. A transaction often involves money. When you pay a bill, take money from the bank or write a cheque, you have made a transaction.

**unit**

Any fixed quantity, amount, distance or measure that is used as a standard. In mathematics, always identify the unit with which you are working. E.g., 3 km, 4 cups, 12 people, \$76, 70 books, 545 g.

**unit price**

The price for a set amount. E.g., price per litre, price per gram.

**unlike fractions**

Fractions which have different denominators.

**vertical**

In an up and down position, e.g., we are vertical when we are standing up. On a page, a vertical line is shown from the top to the bottom of the page.





## Acknowledgements - 1st Edition

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## Versioning History

This page provides a record of edits and changes made to this book since its initial publication. Whenever edits or updates are made in the text, we provide a record and description of those changes here. If the change is minor, the version number increases by 0.01. If the edits involve substantial updates, the version number increases to the next full number.

The files posted by this book always reflect the most recent version. If you find an error in this book, please fill out the [Report an Error](#) form.

Version	Date	Change	Details
1.00	October 3, 2014	Book published using Microsoft Word.	
2.00		Book updated and republished in Pressbooks as a 2nd Edition.	<ul style="list-style-type: none"> <li>• Removed coverage of time in last unit</li> <li>• Reduced the number of exercises per example.</li> <li>• Created a “How to Deal with Math Anxiety” front matter section, which is now standardized across all ALF Math books.</li> <li>• Deleted “Topic A: Emotions and Learning” since that content is now covered in the “How to Deal with Math Anxiety” front matter.</li> <li>• Re-lettered all units and topics in unit 1.</li> <li>• Moved content from Word into Pressbooks.</li> <li>• Added textboxes to visually identify examples and exercises.</li> <li>• Added some headings to give long chapters more structure.</li> </ul>
2.01	June 12, 2024	Corrected answers.	In <a href="#">Topic B: Two- and Three-Digit Multipliers</a> in Unit 1: Multiplication, the answers to many of the problems in Exercise 2 were corrected.