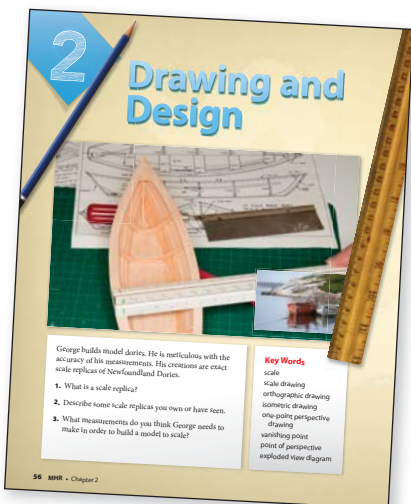


# A Tour of Your Textbook

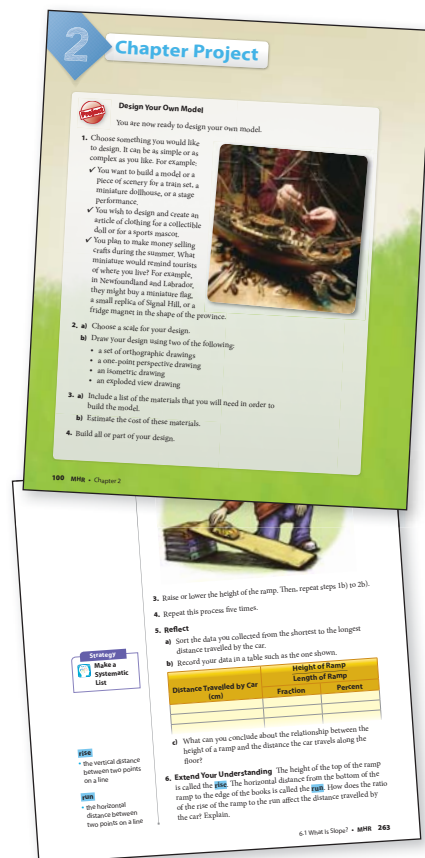
## Chapter Opener

Each chapter begins with a two-page spread which introduces you to what you will learn in the chapter.



The first page includes a visual, a list of **Key Words**, and some questions.

- The visual and questions are related to the **Chapter Project**, which is at the end of the chapter.
- The **Key Words** are used throughout the chapter. The first time each Key Word is used, it is highlighted in **blue**. The word is defined in the margin. Sometimes there is a visual.





## Career Link

The second page of each chapter opener has a **Career Link** and a series of visuals.

- Check the Career Link for information about interesting jobs related to the math in the chapter.
- The pictures show people doing various types of work that use the math in the chapter.

## Get Ready

The Get Ready is next.

- These pages provide a brief review of skills used in the chapter.
- Some of these skills are from previous grades. Others are from previous chapters.
- You will need these skills to be successful with the chapter.

5

Get Ready

**Time**

- Express each time period in years.
  - 24 months
  - 26 weeks
  - 6 months
  - 18 months
  - 1 day
  - April
  - from your current age until you are 60
- Express each time period in months.
  - 4 years
  - 5 years
  - $3\frac{1}{2}$  years
  - 10 years
  - 20 years
  - 25 years
  - from your current age until you are 60

**Numbers**

- List the six different pairs of whole numbers that multiply to 72.
- Express each percent as a decimal number.
 

a) 100%	b) 10%
c) 1%	d) 0.1%
e) 29.9%	f) 19.5%
g) 0.25%	h) 0%

5. Determine without using a calculator.

a) 1% of \$100	b) 1% of \$300
c) 1% of \$1000	d) 1% of \$5000
e) 2% of \$100	f) 2% of \$200
g) 2% of \$2000	h) 2% of \$9000
i) 5% of \$100	j) 10% of \$700
k) 20% of \$7000	l) 50% of \$700 000

- Estimate 3% of \$817 430.
- What sequence of keystrokes would you use on your calculator to get an exact answer to part a)?
- Compare the keystroke sequence you used with the sequence used by some classmates. Does someone have a more efficient sequence?
- With a partner, determine how many ways you can use a calculator to determine 3% of \$817 430.

7. Calculate each power using mental math.

a) $1^{10}$	b) $(0.1)^2$	c) $(0.2)^3$
-------------	--------------	--------------

8. Calculate each power using a calculator.


a) $3^{10}$	b) $(0.4)^{15}$	c) $(1.4)^{20}$
-------------	-----------------	-----------------

**Taxes**

- In Canada, most purchases are subject to the Federal government's Goods and Services Tax (GST).
- Some provinces also charge a Provincial Sales Tax (PST).
- Some provinces combine the two taxes and charge a Harmonized Sales Tax (HST).

Answer the following questions using the tax that is charged where you live.

- Calculate the amount of tax you pay on the purchase of an item that costs each amount.
 

a) \$2	b) \$3
c) \$4	d) \$5
e) \$10	f) \$20
g) \$100	h) \$300
i) \$1000	j) \$4000
- You are purchasing a new car that costs about \$30 000. Approximately how much tax will you have to pay?
 
- The actual cost of the vehicle in #10 is \$29 483.09 before taxes. Calculate the exact amount of tax that you would have to pay.

**Rounding**

When dealing with money, either express your answer to the nearest penny (two decimal places), or to the nearest dollar (whole number).

- Express the following money values to two decimal places.
 

a) \$12.1	b) \$23.375
c) \$38.8	d) \$127.4525
- Round each value in #12 to the nearest dollar.

**Rearrange Formulas**

- Rearrange the formulas as indicated.
 

a) $C = \pi d$ , $d = \frac{C}{\pi}$
b) $A = l \times w$ , $w = \frac{A}{l}$
c) $V = \frac{d}{t}$ , $d = V \times t$
d) $V = lwh$ , $h = \frac{V}{lw}$
e) $A = \frac{1}{2}bh$ , $b = \frac{2A}{h}$

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2 MHR • A Tour of Your Textbook (ISBN: 978-1-25-901237-2)

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## Sections

Each chapter is divided into sections. Each section starts with an **Explore**.

## Explore

This activity is designed to help you build an understanding of the new concept. The activity is often related to the opening visual and introductory text in the section.

The **Reflect** question at the end of each Explore helps you explain what you learned from the activity.

There may be one or more **Extend Your Understanding** questions. These often connect the math skill to a way that people use it in their job or in their lives.

## On the Job

One or more **On the Jobs** follow the **Explore**. These demonstrate how to use the concept from the Explore.

- Each **On the Job** starts with a problem. These problems come from everyday life or work experiences.
- The **Solution** may show one or more ways to solve the problem. One method may make more sense to you than another. Or, you can develop your own method.
- Notes in a speech bubble provide tips for solving the problem.
- Calculator key sequences are shown in gray. You may need to check that your calculator uses the same sequence.

The **On the Job** ends with a **Your Turn**. This gives you an opportunity to show that you understand what you have learned.

4.3

### Graphic Representations

**Focus On ...**

- determining if a graph accurately represents data
- explaining how the same graph can show more than one conclusion
- explaining how a graph can be manipulated to represent a point of view

**Materials**

- grid paper
- ruler
- graphing technology

**Explore Using Graphs to Accurately Represent Data**

Anna and Yuri work with the same data from the Internet. They each represent the data with a different graph.

**Anna's Graph: Recycled Cans in NL**

**Yuri's Graph: Recycled Cans in NL**

1. How are the graphs the same?

2. How are the graphs different?

3. Which graph gives a better representation of the recycling trend? Explain.

4. Anna and Yuri each draw a new graph, showing more recycling information.

**Anna's Graph: Recycled Bottles and Cans in NL**

**Yuri's Graph: Recycled Bottles and Cans in NL**

a) How are their graphs similar? How are they different?

b) Explain how Anna's graph could appear misleading.

5. **Reflect** Anna decides that she might need to redraw her first graph. She decides to change the scale of her vertical axis to 0–50 tonnes, in units of 10 tonnes. Predict how the look of Anna's graph will change.

6. How can the scale on a graph affect the observations someone might make about the data?

7. **Extend Your Understanding** Explain how the following statements could be supported with one of the graphs.

a) Recycling of cans has levelled off for the ten-year period, so the government should provide more incentives for people to recycle.

b) Recycling of cans has drastically increased, so more recycling locations should be built.

c) Recycling of bottles is not significant, so a higher deposit should be placed on bottles.

d) How could a business or organization use these graphs to promote its views on recycling? Give two examples.

4.3 Graphic Representations • MHR 183

4.2

### Interpreting and Extrapolating Values

**On the Job 2**

**Describe Trends in Graphs**

Chelsea is a data analyst for a provincial health center. She gathers the following information about the life expectancy of 65-year-old males in Newfoundland and Labrador since 2000. These data will help doctors develop a healthy living campaign for seniors.

Year	Remaining Life Expectancy (years)
2000	15.0
2001	15.2
2002	15.4
2003	15.6
2004	15.8
2005	15.8
2006	16.0
2007	16.2
2008	16.3

a) Represent Chelsea's data with an appropriate graph.

b) What trend(s) do you notice in the graph?

c) Could this trend continue indefinitely? Why or why not?

**Solution**

Chelsea's information shows the changes to 65-year-old life expectancy over time. Continuous data like these are best shown in a line graph.

- Scale the vertical axis by units of 0.2 years.
- Scale the horizontal axis by units of 1 year.

**65-Year-Old Male Life Expectancy**

a) Create a graph to represent the data appropriately.

b) What trend is evident from the graph?

c) Give a possible reason for this trend.

d) Do you think this trend can continue indefinitely? Why or why not?

**Your Turn**

The table shows the number of female athletes in the Summer Olympic Games for the years 1980 to 2008.

Year	# of Female Athletes
1980	1115
1984	1566
1988	1798
1992	2704
1996	3512
2000	4089
2004	4322
2008	4746

b) The graph shows an upward trend. The life expectancy for 65-year-old males in Newfoundland and Labrador has been steadily increasing.

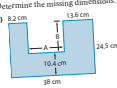

c)

4.2 Interpreting and Extrapolating Values • MHR 177

**Check Your Understanding**

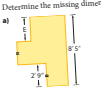
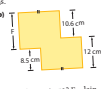
**Try It**

1. Determine the missing dimensions.

a)  b) 

2. Calculate the perimeters of the figures in #1.

3. Determine the missing dimensions.

a)  b) 

4. Can you calculate the perimeters of the figures in #3? Explain.

**Apply It**

5. Krista wants to make a simple dress for her niece. She downloads a dress pattern from the Internet. Krista wants to put a decal above the waistband on the front. Is there enough room for the decal shown? Show your work.

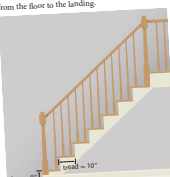
**Tools of the Trade**

The patterns used by seamstresses and tailors are scale drawings. To learn how to adjust a pattern for another size, go to [www.seamstress.com/resources/sewingpatterns](http://www.seamstress.com/resources/sewingpatterns) and follow the links.

**Try It**

The floor in the central hallway from our story is the size of a plot that you walk on.

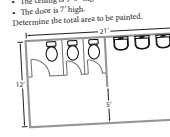
6. Determine the overall height and the overall length of the stairs from the floor to the landing.



7. A hospital's maintenance schedule calls for the walls of all washrooms to be painted. Below is a scale drawing of one washroom.

- All of the walls are made from concrete block that is 6 inches thick.
- The wall separating the sinks from the toilets goes from the floor to the ceiling.
- The ceiling is 9' 6" high.
- The door is 7' high.

Determine the total area to be painted.



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## Check Your Understanding

### Check Your Understanding questions follow each On the Job.

- The first part of this question set includes **Try It** questions. These questions check your knowledge and understanding of the On the Job. Most can be answered by following the example in the On the Job.
- Apply It** questions include problems from everyday life or the workplace. You need to apply the skills you learned in the On the Job to these situations.

## Work With It

The end of each section has **Work With It** questions. To answer these questions, you may need to use knowledge and skills from more than one **On the Job**.

The **Discuss It** questions are communication questions.

- You may wish to discuss the questions with the class, in a group, or with a peer.
- Communicate your thoughts in the way that works best for you. This may be in writing, orally, or visually.

**Work With It**

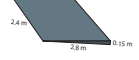
1. A swimming pool builder is digging a hole for an in-ground pool. It will be 34 feet long by 18 feet wide, with an average depth of 4 feet.

a) Calculate the volume of dirt to be removed.

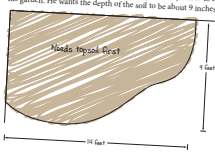
b) A standard dump truck can carry about 135 cubic feet. How many loads will the dump truck need to haul away?

2. A rectangular swimming pool that is 32' by 16' lost a depth of about 1" of water due to evaporation. To the nearest cubic foot, what was the volume of water lost?


3. To the nearest 0.1 m<sup>3</sup>, determine the volume of concrete needed to construct a ramp to the entrance of a building. The ramp is in the shape of a triangular prism.



4. Estimate the number of cubic yards of topsoil Gary needs to fill his garden. He wants the depth of the soil to be about 9 inches.



5. Dana works at a pet store. She is cleaning a fish tank. Estimate the volume of water needed to fill the fish tank.



6. A meeting room in an office building has no windows. The room measures 8.5 m by 5.3 m by 3.2 m.

a) Calculate the volume of air in the room.

b) A circulation system draws approximately 2 m<sup>3</sup> of air per minute. How long does it take to change all the air in the room?

**Discuss It**

7. Discuss with a partner a situation that would require an accurate calculation of volume and a situation that would require only an estimate.

8. The surface area of a box is 108 cm<sup>2</sup>. The volume of the box is 72 cm<sup>3</sup>. Explain why surface area is measured in square units and volume is measured in cubic units.

9. Which scenario involves surface area and which involves volume? Explain how you know.

a) the amount of foam chips needed to fill a cushion


b) the amount of spray paint needed to cover a vase

10. a) Predict whether the volume of the cylinder shown is less than, greater than, or equal to 1 m<sup>3</sup>. Justify your prediction.

b) Calculate the volume, to the nearest tenth of a cubic metre, Compare it to your prediction.

c) Would doubling the height of the cylinder double the volume? Explain why or why not.

d) Would doubling the diameter of the cylinder double the volume? Explain why or why not.



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## Other Features

### F.Y.I.

The F.Y.I. boxes are “for your information.”

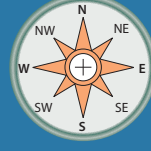
**F.Y.I.**  
The depth of a concrete footing depends on where you live. Generally, the colder the winter is, the deeper the concrete has to be.

- These boxes provide additional information about items in the text.

**F.Y.I.**  
Amelia Earhart was the first woman to fly solo across the Atlantic Ocean. On May 20, 1932, she departed from Harbour Grace, NL, and she landed safely in Northern Ireland about 15 h later.

- Some provide background information.

**F.Y.I.**  
A compass rose is used to display the directions on a map. North usually points to the top of the map or diagram.



- Many of these boxes include visuals which help explain a new word.

### Web Links


**Web Link**  
To check provincial population data, go to [www.mcgrawhill.ca/school/learningcentres](http://www.mcgrawhill.ca/school/learningcentres) and follow the links.

You can find extra information related to some questions on the Internet. Log on to [www.mcgrawhill.ca/school/learningcentres](http://www.mcgrawhill.ca/school/learningcentres). You will be able to link to recommended Web sites.

**Web Link**  
To view a demonstration of how light refracts through a prism, go to [www.mcgrawhill.ca/school/learningcentres](http://www.mcgrawhill.ca/school/learningcentres) and follow the links.

Some of these **Web Links** lead to interactive games and applets.

### Tools of the Trade



**Tools of the Trade**  
Engineers frequently start with scale models of the items they plan to build. Scale models allow them to test how the environment will affect the item. To learn more about building models for this purpose, go to [www.mcgrawhill.ca/school/learningcentres](http://www.mcgrawhill.ca/school/learningcentres) and follow the links.

**Tools of the Trade** boxes provide information about the type of work involved in a specific career, and the tools and equipment used. Go online to [www.mcgrawhill.ca/school/learningcentres](http://www.mcgrawhill.ca/school/learningcentres). You will be able to link to Web sites that provide additional information about that trade. Some include videos of people on the job.

## Games and Puzzles

Have some fun! Two features encourage you to play with the math you are learning.

- A **Games and Puzzles** page at the end of each chapter provides entertaining activities that reinforce the skills you are learning.
- **Puzzler** boxes in some chapters are connected to the math in that chapter.

### Puzzler

How could the cubes shown be cut to create a set of cubes with twice the surface area? Show your reasoning.



## 3 GAMES AND PUZZLES

**Fill Up the Cups**

**Materials**  
• Fill Up the Cups BLM

- Each cup can hold a volume of 1 mL, 2 mL, 3 mL, 4 mL, 5 mL, 6 mL, or 7 mL. Place the cups in the pattern shown so that the sum of the three volumes along each straight path is 12 mL. Use each of the seven volumes only once.

- Compare your solution to those of your classmates.
- How do the solutions differ?
- What one condition must exist to make all of the solutions possible?

Games and Puzzles • MHR 149

**Materials**  
• measuring tape  
or metre stick

**Work With It**

- MINILAB** Wheelchair ramps must have a 1:12 ratio of vertical height to horizontal length to meet safety standards. The safety standards for other types of ramps are different. What are the safety standards for building a skateboard ramp at a skateboard park?

**STEP 1**  
Visit a skateboard park and select two ramps.

**STEP 2**  
For each, measure the horizontal run and vertical rise of the ramp. Record your measurements. Create a diagram of each ramp.

**STEP 3**  
Determine the angle of elevation of each ramp.

**STEP 4**  
What do you think the safe ratio of vertical height to horizontal length is for skateboard ramps? Compare your answers with those of a partner.

## Mini Labs

**MINILAB** Mini Labs in some chapters allow you to experiment with what you are learning.

- These include a **Materials** box in the margin. You need these items in order to do the activity.
- Work with a partner or in a small group. How does the activity help you with the math in the chapter?

## Skill Check

There is a **Skill Check** at the end of each chapter. This is a chapter review.

- The Skill Check starts with a **What You Need to Know** box. This lists the skills covered in the chapter. You can check what section each skill is in.
- The Skill Check is organized by section number. You can look back if you need help with a question.

## 6 Skill Check

**What You Need to Know**

**Section After this section, I know how to...**

- explain slope as rise divided by run
  - verify that the slope is constant for a straight object
  - solve problems that involve slope
  - describe contexts that involve slope
- describe the conditions for a slope that is zero or undefined
  - explain the relationship between slope and angle of elevation
  - explain the safety implications of different slopes
  - solve problems by applying the slope formula
- describe the difference between two slopes
  - explain slope as a rate of change
  - solve problems that involve slope and rate of change

*If you are unsure about any of these questions, review the appropriate section or sections of this chapter.*

**6.1 What Is Slope?, pages 262–273**

- Determine the slope of each line segment.

- Copy and complete the table.

	Rise	Run	Slope
a)	0	6 m	
b)	2 m	3 m	
c)	2 m	200 cm	
d)	4 m	0	
e)	50 cm	3 m	

**6.2 Relationship Between Slope and Angle of Elevation, pages 274–285**

- For each triangle, determine the measure of  $\angle A$  to the nearest degree.
  - 
  -
- A bike ramp has a slope of 1:2. What angle does the ramp make with the ground, to the nearest degree?
- Determine the angle of elevation of a road with the following grades. Express your answer to the nearest degree.
  - 9%
  - 5%
  - 17%

**6.3 Slope as Rate of Change, pages 286–297**

- Compare the upper and lower roofs shown.
  - Describe the difference in the appearance of the roofs.
  - Which roof would be the most difficult to walk on? Why?
  - Suppose the pitches of the roofs are  $\frac{12}{10}$  and  $\frac{12}{8}$ . What is the pitch of the upper roof? What is the pitch of the lower roof? Explain your reasoning.

**7.1 Graph the data in the table.**

x	0	1	2	3	4
y	1	4	7	10	13

- Describe the slope.

Skill Check • MHR 299






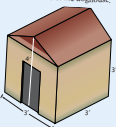
## Test Yourself

The **Test Yourself** at the end of each chapter is a practice test.

- The Test Yourself includes multiple choice and extended response questions.
- It covers similar questions to what you can expect on a chapter test.

### 1 Test Yourself



For #1 and #2, select the best answer.

- What is the approximate area of the yellow part of the cylinder below? 
  - $13 \text{ in.}^2$
  - $30 \text{ in.}^2$
  - $50 \text{ in.}^2$
  - $300 \text{ in.}^2$
- What is the approximate area of the top of the cylinder in #1?
  - $10 \text{ in.}^2$
  - $25 \text{ in.}^2$
  - $50 \text{ in.}^2$
  - $75 \text{ in.}^2$
- Identify the 3-D object that each net represents.
  - 
  - 
  - 
- Part of a playground apparatus has a square-based pyramidal shape. The pyramid has a width of about 136 centimetres and a slant height of about 89 centimetres. Determine the surface area of the entire four sides of the pyramid. Do not include the bottom.
 
- Determine the surface area of the cardboard needed to make a pizza box that is 12" by 12" by 2".
  - Would the surface area of a pizza box that is 24" by 12" by 2" be double your answer to part a)? Explain.
- Andrew wants to re-stain a doghouse. Calculate the surface area of the exterior of the doghouse.
 
- John calculated the surface area of the paper cup using the formula for the surface area of a cone. Explain the error in his solution.
 
$$SA = \pi r^2 + \pi r s$$

$$= \pi \cdot 5^2$$

$$= 157.08 \text{ cm}^2$$



You need about  $1\frac{1}{2}$  m<sup>2</sup> of paper to make the cup.



- An NBA basketball has a diameter of about 238 mm. What is the surface area of the rubber surface of an NBA basketball?
  - Express your answer to the nearest tenth of a square millimetre.
  - Express your answer to the nearest tenth of a square centimetre.

Test Yourself • MHR 53

### 3 Chapter Project

**Project** Build a 3-D Object

- Design and build an object that is a composite 3-D figure. It could be something for inside, such as a candleholder or a water feature.  It could be a container, such as a vase or an instrument case. 

It could be something for outside, such as a birdhouse or a fountain. 

Decide how big it will be and what it will be made of. It could be the actual size or it could be a scale model.

- Calculate the surface area and volume of your 3-D object.

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## Chapter Project

Each **Chapter Project** requires you to use skills from the chapter. You will also need to use your creativity.

## Answers

Answers are provided for the Get Ready, Check Your Understanding, Work With It, Skill Check, and Test Yourself questions. They start on page 360 in the student resource. Sample answers are provided for questions that have several possible answers or that involve communication.

## Glossary

Refer to the illustrated **Glossary** starting on page 404 of the student resource. This provides the exact meaning of mathematical terms.