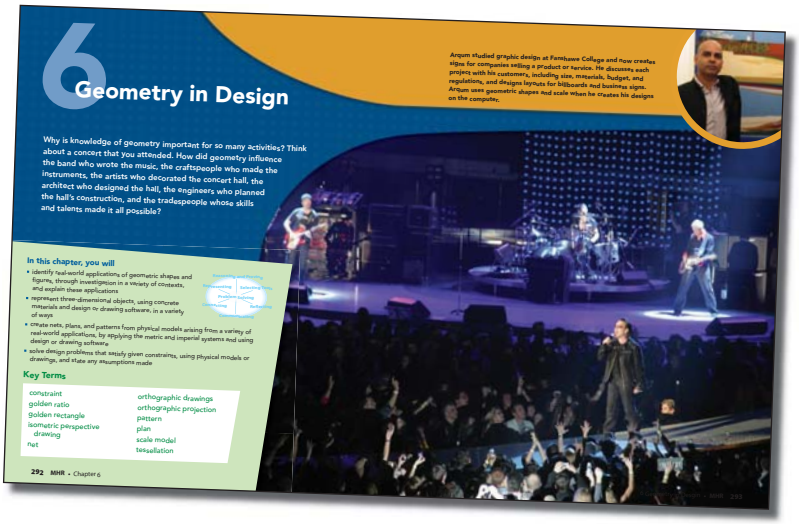
A Tour of Your Textbook

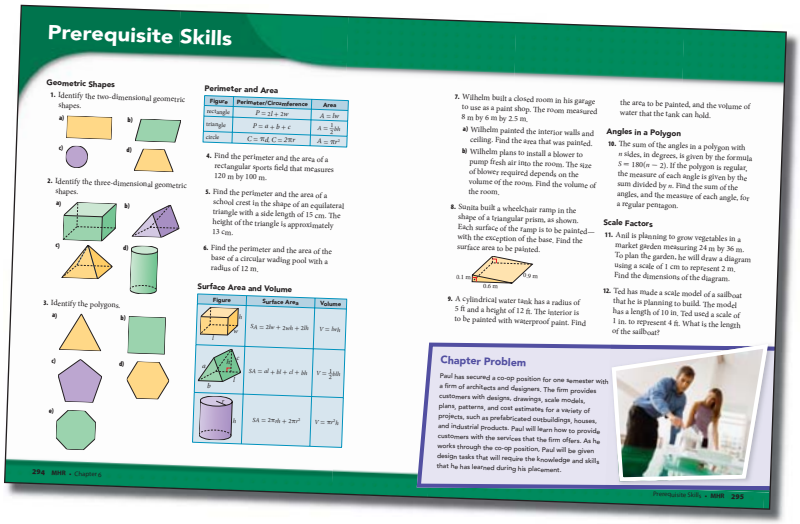
Chapter Opener

- This two-page spread introduces the concepts you will learn about in the chapter.
- The specific curriculum expectations that the chapter covers are listed.
- Key Terms lists the mathematical terms that are introduced and defined in the chapter.



Prerequisite Skills

- Questions review key skills from previous mathematics courses that are needed for success with the new concepts of the chapter.
- The chapter problem is introduced. Questions related to the chapter problem occur in the Apply sections of the exercises throughout the chapter and are identified by a **Chapter Problem** descriptor.



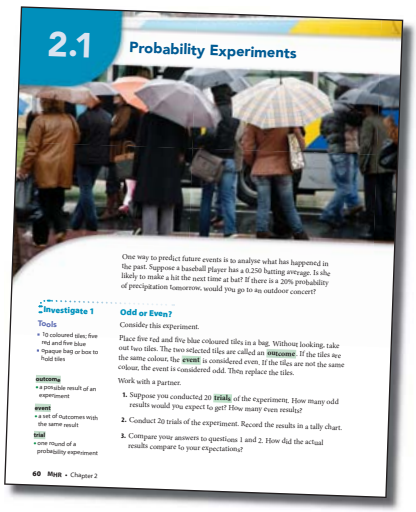
Numbered Sections

Lesson Opener

Lessons start with a photograph and short description of a real-world setting to which the mathematical concepts relate.

Investigate

These are step-by-step activities, leading you to build your own understanding of the new concepts of the lesson. Many of these activities can best be done by working in pairs or small groups to share ideas.

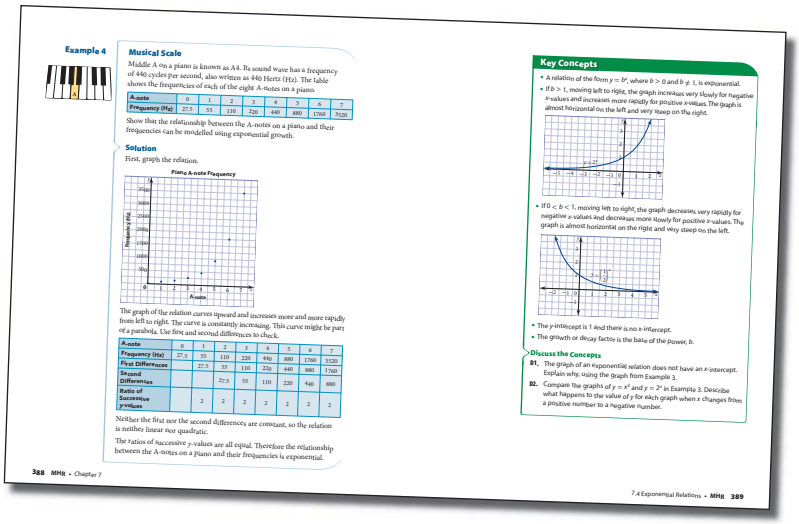


Examples

- Worked Examples provide model solutions that show how the new concepts are used.
- The Examples and their worked Solutions include several tools to help you understand the work.
  - Side notes help you think through the steps.
  - Sometimes different methods of solving the same problem are shown. One method may make more sense to you than the other.
  - Calculator key strokes for scientific, Direct Algebraic Logic (DAL), and graphing calculators are provided. Sample graphing calculator screens are shown.

Key Concepts

- This feature summarizes the concepts learned in the lesson.
- You can refer to this summary when you are studying or doing homework.



Discuss the Concepts

These questions allow you to reflect on the concepts of the section. By discussing these questions in a group, you can see whether you understand the main points and are ready to start the exercises.

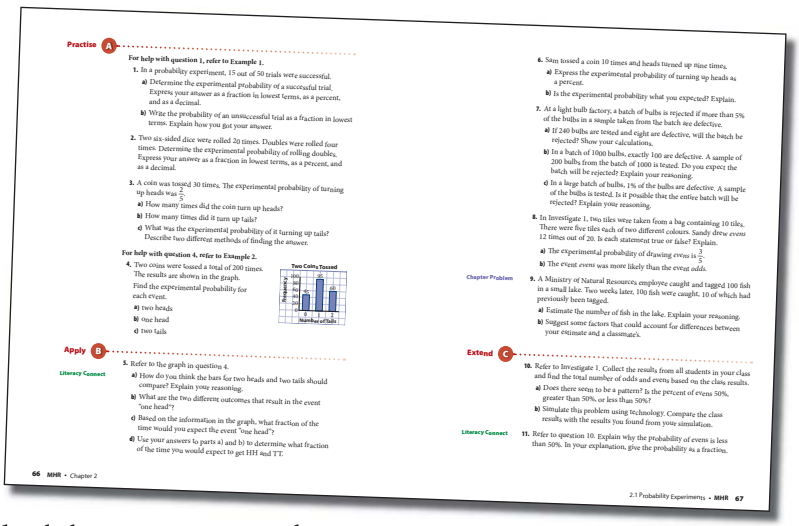
Exercises

Practise (A)

- These questions provide an opportunity to practise your knowledge and understanding of the new concept.
- To help you, questions are referenced to the worked Examples.

Apply (B)

- These questions allow you to use what you learned to solve problems and make connections among concepts. In answering these questions you will be integrating many of the math processes.
- Some questions are specifically designed to help you improve your literacy skills. These questions are identified with a **Literacy Connect** descriptor.



Extend (C)

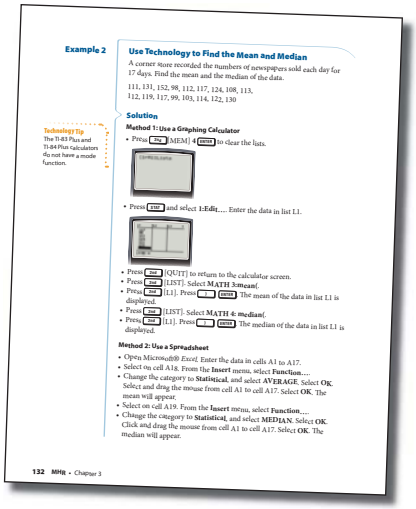
- These are more challenging and thought-provoking questions.
- Some Extend questions may require integration of skills from other areas.

A Tour of Your Textbook

Technology

Scientific calculators are useful for many sections. Key-stroke sequences are provided for techniques that may be new to you.

- A TI-83 Plus or TI-84 Plus graphing calculator is useful for some sections, particularly for data analysis and for graphing relations.


Example 2

Use Technology to Find the Mean and Median

A corner store recorded the numbers of newspapers sold each day for 17 days. Find the mean and the median of the data.

111, 131, 152, 98, 112, 117, 124, 108, 113, 112, 119, 117, 99, 103, 114, 122, 130

Solution

Method 1: Use a Graphing Calculator

Technology Tip
The TI-83 Plus and TI-84 Plus calculators do not have a mode function.

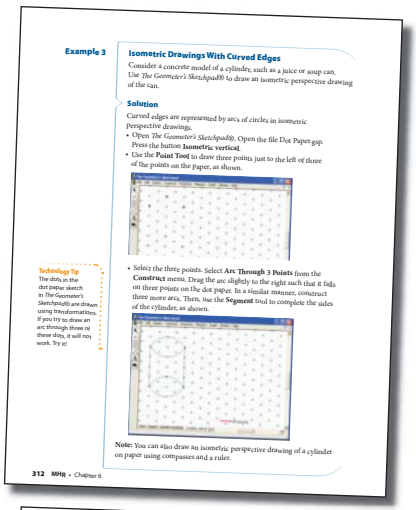
- Press [2nd] [MEM] 4 [ENTER] to clear the lists.
- Press [STAT] and select 1:Edit.... Enter the data in list L1.
- Press [2nd] [QUIT] to return to the calculator screen.
- Press [2nd] [LIST]. Select MATH 3:mean(.
- Press [2nd] [L1]. Press [)] [ENTER]. The mean of the data in list L1 is displayed.
- Press [2nd] [LIST]. Select MATH 4: median(.
- Press [2nd] [L1]. Press [)] [ENTER]. The median of the data in list L1 is displayed.

Method 2: Use a Spreadsheet

- Open Microsoft® *Excel*. Enter the data in cells A1 to A17.
- Select cell A18. From the **Insert** menu, select **Function**....
- Change the category to **Statistical**, and select **AVERAGE**. Select **OK**. Select and drag the mouse from cell A1 to cell A17. Select **OK**. The mean will appear.
- Select on cell A19. From the **Insert** menu, select **Function**....
- Change the category to **Statistical**, and select **MEDIAN**. Select **OK**. Click and drag the mouse from cell A1 to cell A17. Select **OK**. The median will appear.

132 MHR • Chapter 3

- *The Geometer's Sketchpad*® is used in several sections for investigating concepts related to measurement and geometry. Alternative steps for doing investigations using pencil and paper are provided for those who may not have access to this computer software.
- Spreadsheet software and *Fathom*™ are used in the Statistics chapter.


Example 3

Isometric Drawings With Curved Edges

Consider a concrete model of a cylinder, such as a juice or soup can. Use *The Geometer's Sketchpad*® to draw an isometric perspective drawing of the can.

Solution

Curved edges are represented by arcs of circles in isometric perspective drawings.

- Open *The Geometer's Sketchpad*®. Open the file Dot Paper.gsp. Press the button **Isometric vertical**.
- Use the **Point Tool** to draw three points just to the left of three of the points on the paper, as shown.

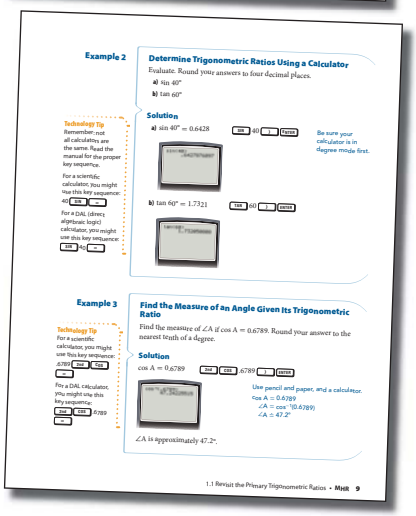
Technology Tip
The dots in the dot paper sketch in *The Geometer's Sketchpad*® are drawn using this information. If you try to draw an arc through three of these dots, it will not work. Try it!

- Select the three points. Select **Arc Through 3 Points** from the **Construct** menu. Drag the arc slightly to the right such that it fits on three points on the dot paper. In a similar manner, construct three more arcs. Then, use the **Segment** tool to complete the sides of the cylinder, as shown.

Note: You can also draw an isometric perspective drawing of a cylinder on paper using compasses and a ruler.

312 MHR • Chapter 6

- The Technology Appendix, on pages 514–549, provides detailed instructions for some basic functions of the technology tools used in the text. The Appendix will be helpful to anyone who has not used these tools before.


Example 2

Determine Trigonometric Ratios Using a Calculator

Evaluate. Round your answers to four decimal places.

a) sin 40°

b) tan 60°

Solution

Technology Tip
Remember, not all calculators are the same. Read the manual for the proper key sequence.

For a scientific calculator, you might use this key sequence: 40 [SIN] [=].

For a DAL (direct algebraic logic) calculator, you might use this key sequence: [SIN] 40 [=].

a) sin 40° = 0.6428

[SIN] 40 [)] [ENTER]

Be sure your calculator is in degree mode first.

b) tan 60° = 1.7321

[TAN] 60 [)] [ENTER]

Example 3

Find the Measure of an Angle Given Its Trigonometric Ratio

Find the measure of ∠A if cos A = 0.6789. Round your answer to the nearest tenth of a degree.

Solution

Technology Tip
For a scientific calculator, you might use this key sequence: .6789 [2nd] [COS] [=].

For a DAL calculator, you might use this key sequence: [2nd] [COS] .6789 [=].

cos A = 0.6789

[2nd] [COS] .6789 [)] [ENTER]

Use pencil and paper, and a calculator.

$\cos A = 0.6789$

$\angle A = \cos^{-1}(0.6789)$

$\angle A \approx 47.2°$

∠A is approximately 47.2°.

1.1 Revisit the Primary Trigonometric Ratios • MHR 9

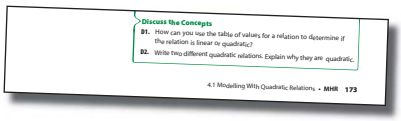
Technology Tip

This margin feature provides helpful hints or alternative strategies for working with the specific tools shown in a solution.

Assessment

Discuss the Concepts

- These questions provide an opportunity to assess your understanding of the key concepts before proceeding to use your skills in the Practise, Apply, and Extend questions.
- Through this discussion you can identify any concepts or areas you need to study further.


Discuss the Concepts

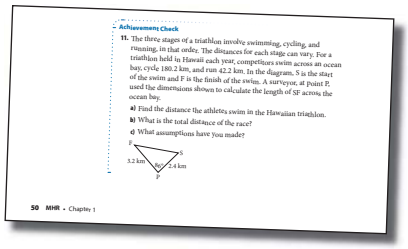
D1. How can you use the table of values for a relation to determine if the relation is linear or quadratic?

D2. Write two different quadratic relations. Explain why they are quadratic.

4.1 Modelling With Quadratic Relations • MHR 173

Special Apply questions:

- Questions with the **Chapter Problem** descriptor are related to the Chapter Problem.
- The last Apply question of some sections provides an opportunity to demonstrate your knowledge and understanding, and your ability to apply, think, and communicate what you have learned. **Achievement Check** questions occur every two or three sections and are designed to assess learning of the key concepts of those few sections.


Achievement Check

11. The three stages of a triathlon involve swimming, cycling, and running, in that order. The distances for each stage can vary. For a triathlon held in Hawaii each year, competitors swim across an ocean bay, cycle 180.2 km, and run 42.2 km. In the diagram, S is the start of the swim and F is the finish of the swim. A surveyor, at point P, used the dimensions shown to calculate the length of SF across the ocean bay.

a) Find the distance the athletes swim in the Hawaiian triathlon.

b) What is the total distance of the race?

c) What assumptions have you made?

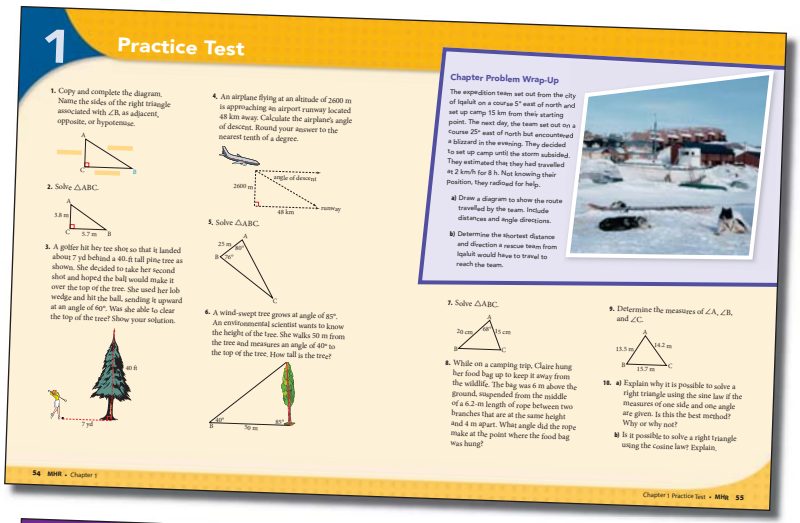
50 MHR • Chapter 1

Practice Test

Each chapter ends with a Practice Test. Most tests include some multiple-choice questions. Practising this type of question will help you prepare for college entrance tests.

Chapter Problem Wrap-Up

This summary problem occurs at the end of the Practice Test. The Chapter Problem Wrap-Up may be assigned as a project.


1 Practice Test

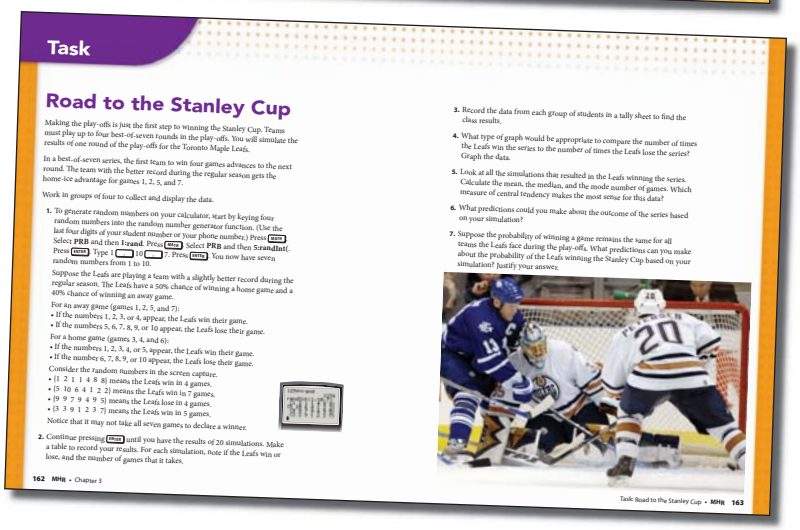
Chapter Problem Wrap-Up

54 MHR • Chapter 1

Chapter 1 Practice Test • MHR 55

Tasks

Tasks are presented at the end of chapters 3, 5, and 9. These are more involved problems that require you to use several concepts from the preceding chapters. Each task has multi-part questions and will take at least 20 min to complete.


Task

Road to the Stanley Cup

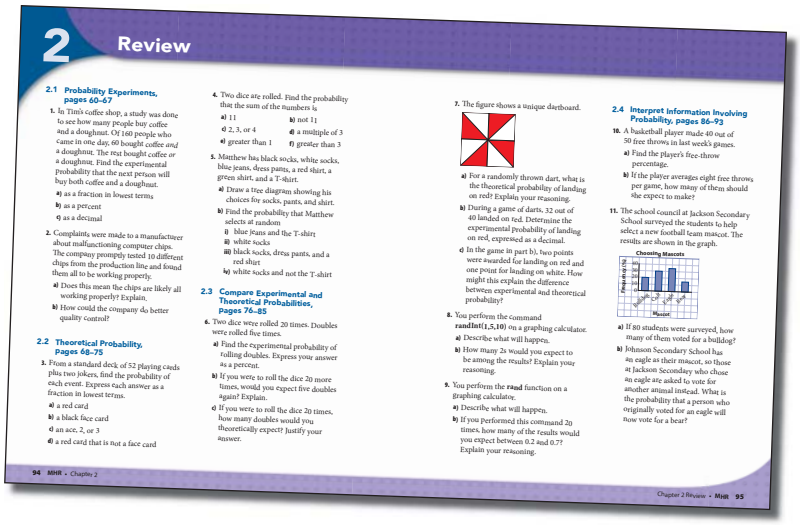
162 MHR • Chapter 3

Task: Road to the Stanley Cup • MHR 163

A Tour of Your Textbook

Chapter Review

- This feature appears at the end of each chapter.
- By working through these questions, you will identify areas where you may need more review or study before doing the Practice Test.



2 Review

2.1 Probability Experiments, pages 60–67

1. In Tim's coffee shop, a study was done to see how many people buy coffee and a doughnut. Of 160 people who came in one day, 60 bought coffee *and* a doughnut. The rest bought coffee *or* a doughnut. Find the experimental probability that the next person will buy both coffee and a doughnut.
   a) as a fraction in lowest terms
   b) as a percent
   c) as a decimal
2. Complaints were made to a manufacturer about malfunctioning computer chips. The company promptly tested 10 different chips from the production line and found them all to be working properly.
   a) Does this mean the chips are likely all working properly? Explain.
   b) How could the company do better quality control?

2.2 Theoretical Probability, pages 68–75

3. From a standard deck of 52 playing cards plus two jokers, find the probability of each event. Express each answer as a fraction in lowest terms.
   a) a red card
   b) a black face card
   c) an ace, 2, or 3
   d) a red card that is not a face card
4. Two dice are rolled. Find the probability that the sum of the numbers is
   a) 11 b) not 11
   c) 2, 3, or 4 d) a multiple of 3
   e) greater than 1 f) greater than 3
5. Matthew has black socks, white socks, blue jeans, dress pants, a red shirt, a green shirt, and a T-shirt.
   a) Draw a tree diagram showing his choices for socks, pants, and shirt.
   b) Find the probability that Matthew selects at random
   i) blue jeans and the T-shirt
   ii) white socks
   iii) black socks, dress pants, and a red shirt
   iv) white socks and not the T-shirt

2.3 Compare Experimental and Theoretical Probabilities, Pages 76–85

6. Two dice were rolled 20 times. Doubles were rolled five times.
   a) Find the experimental probability of rolling doubles. Express your answer as a percent.
   b) If you were to roll the dice 20 more times, would you expect five doubles again? Explain.
   c) If you were to roll the dice 20 times, how many doubles would you theoretically expect? Justify your answer.
7. The figure shows a unique dartboard.
   a) For a randomly thrown dart, what is the theoretical probability of landing on red? Explain your reasoning.
   b) During a game of darts, 32 out of 40 landed on red. Determine the experimental probability of landing on red, expressed as a decimal.
   c) In the game in part b), two points were awarded for landing on red and one point for landing on white. How might this explain the difference between experimental and theoretical probability?
8. You perform the command **randInt(1,10)** on a graphing calculator.
   a) Describe what will happen.
   b) How many 2s would you expect to be among the results? Explain your reasoning.
9. You perform the **rand** function on a graphing calculator.
   a) Describe what will happen.
   b) If you performed this command 20 times, how many of the results would you expect between 0.2 and 0.7? Explain your reasoning.

2.4 Interpret Information Involving Probability, pages 86–93

10. A basketball player made 40 out of 50 free throws in last week's games.
    a) Find the player's free-throw percentage.
    b) If the player averages eight free throws per game, how many of them should she expect to make?
11. The school council at Jackson Secondary School surveyed the students to help select a new football team mascot. The results are shown in the graph.

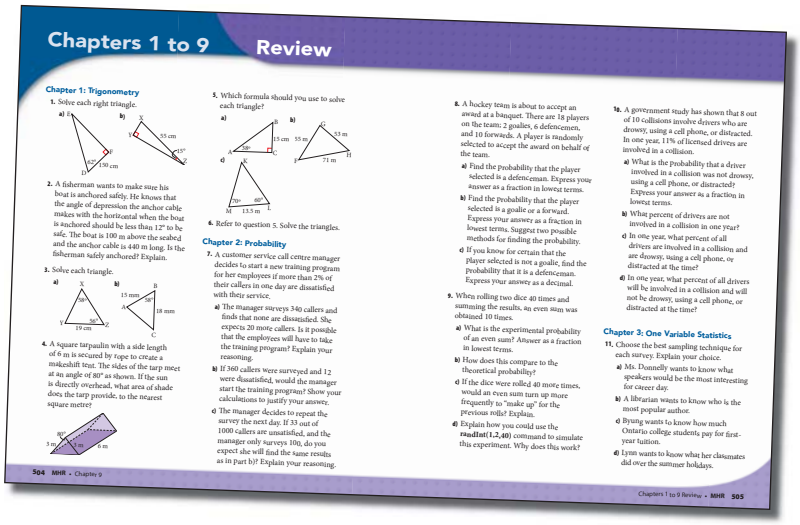
    a) If 80 students were surveyed, how many of them voted for a bulldog?
    b) Johnson Secondary School has an eagle as their mascot, so those at Jackson Secondary who chose an eagle are asked to vote for another animal instead. What is the probability that a person who originally voted for an eagle will now vote for a bear?

94 MHR • Chapter 2

Chapter 2 Review • MHR 95

Cumulative Review

- A cumulative review occurs at the end of chapters 3, 6, and 9. These questions allow you to review concepts you learned in the chapters since the last cumulative review.
- A course review follows chapter 9. You can use this to help prepare for a final examination.



Chapters 1 to 9 Review

Chapter 1: Trigonometry

1. Solve each right triangle.
2. A fisherman wants to make sure his boat is anchored safely. He knows that the angle of depression the anchor cable makes with the horizontal when the boat is anchored should be less than 12° to be safe. The boat is 100 m above the seabed and the anchor cable is 440 m long. Is the fisherman safely anchored? Explain.
3. Solve each triangle.
4. A square tarpaulin with a side length of 6 m is secured by rope to create a makeshift tent. The sides of the tarp meet at an angle of 80° as shown. If the sun is directly overhead, what area of shade does the tarp provide, to the nearest square metre?
5. Which formula should you use to solve each triangle?
6. Refer to question 5. Solve the triangles.

Chapter 2: Probability

7. A customer service call centre manager decides to start a new training program for her employees if more than 2% of their callers in one day are dissatisfied with their service.
   a) The manager surveys 340 callers and finds that none are dissatisfied. She expects 20 more callers. Is it possible that the employees will have to take the training program? Explain your reasoning.
   b) If 360 callers were surveyed and 12 were dissatisfied, would the manager start the training program? Show your calculations to justify your answer.
   c) The manager decides to repeat the survey the next day. If 33 out of 1000 callers are unsatisfied, and the manager only surveys 100, do you expect she will find the same results as in part b)? Explain your reasoning.
8. A hockey team is about to accept an award at a banquet. There are 18 players on the team; 2 goalies, 6 defencemen, and 10 forwards. A player is randomly selected to accept the award on behalf of the team.
   a) Find the probability that the player selected is a defenceman. Express your answer as a fraction in lowest terms.
   b) Find the probability that the player selected is a goalie or a forward. Express your answer as a fraction in lowest terms. Suggest two possible methods for finding the probability.
   c) If you know for certain that the player selected is not a goalie, find the probability that it is a defenceman. Express your answer as a decimal.
9. When rolling two dice 40 times and summing the results, an even sum was obtained 10 times.
   a) What is the experimental probability of an even sum? Answer as a fraction in lowest terms.
   b) How does this compare to the theoretical probability?
   c) If the dice were rolled 40 more times, would an even sum turn up more frequently to "make up" for the previous rolls? Explain.
   d) Explain how you could use the **randInt(1,2,40)** command to simulate this experiment. Why does this work?
10. A government study has shown that 8 out of 10 collisions involve drivers who are drowsy, using a cell phone, or distracted. In one year, 11% of licensed drivers are involved in a collision.
    a) What is the probability that a driver involved in a collision was not drowsy, using a cell phone, or distracted? Express your answer as a fraction in lowest terms.
    b) What percent of drivers are not involved in a collision in one year?
    c) In one year, what percent of all drivers are involved in a collision and are drowsy, using a cell phone, or distracted at the time?
    d) In one year, what percent of all drivers will be involved in a collision and will not be drowsy, using a cell phone, or distracted at the time?

Chapter 3: One Variable Statistics

11. Choose the best sampling technique for each survey. Explain your choice.
    a) Ms. Donnelly wants to know what speakers would be the most interesting for career day.
    b) A librarian wants to know who is the most popular author.
    c) Byung wants to know how much Ontario college students pay for first-year tuition.
    d) Lynn wants to know what her classmates did over the summer holidays.

504 MHR • Chapter 9

Chapters 1 to 9 Review • MHR 505

Other Features

The Mathematical Process

Seven mathematical processes that are integral to learning mathematics:

- problem solving
- reasoning and proving
- reflecting
- selecting tools and computational strategies
- connecting
- representing
- communicating

The processes are interconnected and are used throughout the course. Some exercises are flagged with a mathematical processes graphic to remind you which of the processes are involved in solving the problem.

Math Connect

This margin feature points out connections among topics in the course or provides extra information related to an example.

Math Connect

1 knot = 1.852 km/h

Literacy Connect

This margin feature provides tips to help you read and interpret problems.

Literacy Connect

Risk is the uncertainty or the likelihood that an investment will decrease in value.

Internet Links

In some questions, it is suggested that you use the Internet to help solve the problem or to research or collect information. Some direct links are provided via our Web site *www.mcgrawhill.ca/links/foundations11*.

Back Matter

Answers

Complete answers are provided on pages 550–587 for all questions in each Prerequisite Skills, numbered section, Chapter Review, Practice Test, and cumulative review. Answers for the Investigate, Discuss the Concepts, and Achievement Check questions are provided in *Foundations for College Mathematics 11 Teacher's Resource*.

Glossary

A complete illustrated glossary is included on pages 588–594. It includes all the key terms of the text, as well as other mathematical terms.

Index

A general index is included on pages 595–597.