8

Represent Quadratic Relations

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Quadratic Relations of the Form $y = ax^2 + bx + c$

Student Text Pages
316–359

Suggested Timing
10–15 min

Related Resources
BLM 1.CO.1 Literacy Link: Mind Map

Key Terms

zeros

Chapter Curriculum Specific Expectations

Identifying Characteristics of Quadratic Relations

In this chapter, students will

QR2.04 compare, through investigation using technology, the graphical representations of a quadratic relation in the form $y = x^2 + bx + c$ and the same relation in the factored form $y = (x – r)(x – s)$ (i.e., the graphs are the same), and describe the connections between each algebraic representation and the graph (e.g., the y-intercept is c in the form $y = x^2 + bx + c$; the x-intercepts are r and s in the form $y = (x – r)(x – s)$)

Solving Problems by Interpreting Graphs of Quadratic Relations

In this chapter, students will

QR3.01 solve problems involving a quadratic relation by interpreting a given graph or a graph generated with technology from its equation
QR3.02 solve problems by interpreting the significance of the key features of graphs obtained by collecting experimental data involving quadratic relations

Teaching Suggestions

Chapter Opener
• Ask students to list some real-life situations that might be represented by a quadratic relation (a parabola) (e.g., structures such as the McDonald's arches or the Dufferin Gates at the Exhibition Place in Toronto, the path of a soccer ball that has been kicked).

Literacy Link
• Have students begin a Mind Map to consolidate their understanding of the concepts related to quadratic relations. You may wish to have students use **BLM 8.CO.1 Literacy Link: Mind Map** for this activity.
• For more information on the Think Literacy program, visit http://www.edu.gov.on.ca/eng/studentsuccess/thinkliteracy.

Career Profile
• Have students discuss their understanding of the role of a civil engineering technician.
• Have students research other careers that might make use of quadratic relations.
• Encourage students to find out what education is required to work as a civil engineering technician or in one of the other careers that might make use of quadratic relations.

Additional information and teaching materials for this chapter are available on the McGraw-Hill Ryerson web site at http://mcgrawhill.ca/books/foundations10. You will need your password to access this material.

Chapter 8 Planning Chart

Section Suggested Timing	Student Text Page(s)	Teacher's Resource Blackline Masters	Assessment	Tools
Chapter 8 Opener • 10–15 min	316–317	• BLM 8.CO.1 Literacy Link: Mind Map		
Get Ready! • 80 min	318–319	• BLM 8.GR.1 Practice: Get Ready • BLM G1 Grid Paper	• BLM 8.GR.2 Get Ready Self-Assessment Checklist	• grid paper
8.1 Interpret Quadratic Relations • 80–160 min	320–328	• BLM 8.1.1 Practice: Interpret Quadratic Relations	• BLM 8.1.2 Achievement Check Rubric	• graphing calculators
8.2 Represent Quadratic Relations in Different Ways • 80 min	329–335	• BLM 8.2.1 Practice: Represent Quadratic Relations in Different Ways		• graphing calculators
8.3 The Quadratic Relation $y = ax^2 + c$ • 80 min	336–343	• BLM 8.3.1 Practice: The Quadratic Relation $y = ax^2 + c$ • BLM G1 Grid Paper		• Calculator-Based Rangers (CBR™) • graphing calculators • grid paper
8.4 Solve Problems Involving Quadratic Relations • 80–120 min	344–351	• BLM 8.4.1 Practice: Solve Problems Involving Quadratic Relations • BLM 8.CO.1 Literacy Link: Mind Map • BLM G1 Grid Paper	• BLM 8.4.2 Achievement Check Rubric	• graphing calculators • grid paper
Chapter 8 Review • 80 min	352–353	• BLM 8.CR.1 Chapter 8 Review		• graphing calculators
Chapter 8 Practice Test • 80 min	354–355	• BLM G1 Grid Paper	• BLM 8.PT.1 Chapter 8 Practice Test • BLM 8.CT.1 Chapter 8 Test	• graphing calculators • grid paper
Chapter 8 Problem Wrap-Up • 80 min	355	• BLM G1 Grid Paper	• BLM 8.CP.1 Chapter 8 Problem Wrap-Up Rubric	• graphing calculators • grid paper
Chapters 6 to 8 Review • 80 min	358–359	• BLM G1 Grid Paper	• BLM A9 Self-Assessment Recording Sheet • BLM A16 Self-Assessment Checklist	• graphing calculators • grid paper
Task: Home Run Derby • 80 min	356–357	• BLM G1 Grid Paper	• BLM 8.T.1 Task: Home Run Derby Rubric	• graphing calculators • grid paper

Chapter 8 Blackline Masters Checklist

		Title	Purpose
Chapter 8 Opener			
	BLM 8.CO.1	Literacy Link: Mind Map	Literacy
Get Ready!			
	BLM 8.GR.1	Practice: Get Ready	Practice
	BLM 8.GR.2	Get Ready Self-Assessment Checklist	Self-Assessment
	BLM G1	Grid Paper	Student Support
8.1 Interpret Quadratic Relations			
	BLM 8.1.1	Practice: Interpret Quadratic Relations	Practice
	BLM 8.1.2	Achievement Check Rubric	Assessment
8.2 Represent Quadratic Relations in Different Ways			
	BLM 8.2.1	Practice: Represent Quadratic Relations in Different Ways	Practice
8.3 The Quadratic Relation $y = ax^2 + c$			
	BLM 8.3.1	Practice: The Quadratic Relation $y = ax^2 + c$	Practice
	BLM G1	Grid Paper	Student Support
8.4 Solve Problems Involving Quadratic Relations			
	BLM 8.4.1	Practice: Practice: Solve Problems Involving Quadratic Relations	Practice
	BLM 8.4.2	Achievement Check Rubric	Assessment
	BLM 8.CO.1	Literacy Link: Mind Map	Literacy
	BLM G1	Grid Paper	Student Support
Chapter 8 Review			
	BLM 8.CR.1	Chapter 8 Review	Review
Chapter 8 Practice Test			
	BLM 8.PT.1	Chapter 8 Practice Test	Diagnostic Assessment
	BLM 8.CT.1	Chapter 8 Test	Summative Assessment
	BLM G1	Grid Paper	Student Support
Chapter 8 Problem Wrap-Up			
	BLM 8.CP.1	Chapter 8 Problem Wrap-Up Rubric	Summative Assessment
	BLM G1	Grid Paper	Student Support
Chapters 6 to 8 Review			
	BLM A16	Self-Assessment Checklist	Self-Assessment
	BLM A9	Self-Assessment Recording Sheet	Self-Assessment
	BLM G1	Grid Paper	Student Support
Task: Home Run Derby			
	BLM 8.T.1	Task: Home Run Derby Rubric	Assessment
	BLM G1	Grid Paper	Student Support

Get Ready!

Common Errors

• Some students may complete the operations in the order they appear from left to right when evaluating algebraic expressions.
R_x Remind students to use the order of operations, BEDMAS, when evaluating expressions with more than one operation.

• Some students may forget to include the negative sign with the base when evaluating a power with a negative base. For example, they may write $(-3)^2 = -9$.
R_x Suggest that students write the power as a multiplication, for example, $(-3)^2 = (-3)(-3) = 9$.

• Some students may find a common factor that is not the greatest common factor when factoring a polynomial.
R_x Encourage students to check the polynomial in brackets in the factored expression for common factors.

Accommodations

Visual—For students with visual challenges, consider enlarging graphs and providing grid paper with larger grid squares.

Teaching Suggestions
• Have students work individually to complete the Get Ready questions.
• Have students complete all the Get Ready questions before proceeding with Section 8.1.
• You may wish to use **BLM G1 Grid Paper** to support the Get Ready activities.
• Use **BLM 8.GR.1 Practice: Get Ready** for extra practice or remediation.
• Answers to the Get Ready questions can be taken up in class or collected to provide a diagnostic assessment of students' prior knowledge and understanding.
• All BLMs referred to throughout this chapter can be found in the *Foundations of Mathematics 10: Teacher's Resource* CD-ROM.

Assessment
• Assess students' readiness to proceed by informal observation as students are working on the questions. A formal test would be inappropriate since this material is not part of the grade 10 curriculum for this chapter.
• Student self-assessment is also an effective technique; students can place a checkmark beside topics in the Get Ready in which they feel confident with the necessary skills. Alternatively, you could have students use **BLM 8.GR.2 Get Ready Self-Assessment Checklist** as a self-assessment.
• Remedial action can be taken in small groups or with a whole-class skills review.

Chapter Problem
• The Chapter Problem introduced in the Get Ready requires students to apply quadratic relations to design a skateboard park.
• You may wish to have students complete the Chapter Problem questions throughout the chapter. Alternatively, you may wish to assign only the Chapter Problem Wrap-Up when students have completed the chapter.
• The Chapter Problem Wrap-Up is a summative assessment.