Solving Systems of Linear Equations Graphically

8

General Outcome

Develop algebraic and graphical reasoning through the study of relations.

Specific Outcomes

RF1 Interpret and explain the relationships among data, graphs and situations.

RF3 Demonstrate an understanding of slope with respect to:
- rise and run
- line segments and lines
- rate of change
- parallel lines
- perpendicular lines.

RF7 Determine the equation of a linear relation, given:
- a graph
- a point and the slope
- two points
- a point and the equation of a parallel or perpendicular line

to solve problems.

RF9 Solve problems that involve systems of linear equations in two variables, graphically and algebraically.

By the end of this chapter, students will be able to

Section	Understanding Concepts, Skills, and Processes
8.1	✓ explain the meaning of the point of intersection of a system of linear equations
	✓ solve a system of linear equations graphically, with and without technology
8.2	✓ model a situation using a system of linear equations
	✓ interpret information from the graph of a system of linear equations
	✓ solve problems involving systems of linear equations
8.3	✓ explain why a system of linear equations may have no solution, one solution, or an infinite number of solutions
	✓ predict and verify the number of solutions a system of linear equations has

Assessment	Supporting Learning
Assessment *as* Learning	
Use the Before column of **BLM 8–1 Chapter 8 Self-Assessment** to provide students with the big picture for this chapter and help them identify what they already know, understand, and can do. You may wish to have students keep this master in their math portfolio and refer to it during the chapter.	• During work on the chapter, have students keep track of what they need to work on in the What I Need to Work On section of their Foldable. They can check off each item as they develop the skill or process at an appropriate level.
Assessment *for* Learning	
Method 1: Use the introduction on page 414 in *Mathematics 10* to activate student prior knowledge about the skills and processes that will be covered in this chapter. **Method 2:** Have students develop a journal entry to explain what they personally know about linear relations. You might provide the following prompts: • Where have you encountered a graph of a linear relation? • What were the variables involved in the graph? • Did you know the equation of the graph? How could you determine it? • When might you have seen two lines graphed together? What story could you make up about the graph?	• Have students use the What I Need to Work On section of their Foldable to keep track of the skills and processes that need attention. They can check off each item as they develop the skill or process at an appropriate level. • Students who require activation of prerequisite skills may wish to complete **BLM 8–2 Chapter 8 Prerequisite Skills**. This material is on the Teacher CD of this Teacher's Resource and mounted on the www.mhrmath10.ca book site.
Assessment *as* Learning	
Chapter 8 Foldable As students work on each section in Chapter 8, have them keep track of any problems they are having in the What I Need to Work On section of their Foldable.	• As students complete each section, have them review the list of items they need to work on and check off any that have been handled. • Encourage students to write definitions for the Key Terms in their own words, including reminder tips that may be helpful for review throughout the chapter.
Assessment *for* Learning	
BLM 8–3 Chapter 8 Warm-Up This reproducible master includes a warm-up to be used at the beginning of each section. Each warm-up provides a review of prerequisite skills needed for the section.	• As students complete questions, note which skills they are retaining and which ones may need additional reinforcement. • Use the warm-up to provide additional opportunities for students to demonstrate their understanding of the chapter material. • Have students share their strategies for completing mathematics calculations.

Chapter 8 Planning Chart

Section/ Suggested Timing	Prerequisite Skills	Materials/Technology	Teacher's Resource Blackline Masters	Exercise Guide	Assessment		
					Assessment *as* Learning	Assessment *for* Learning	Assessment *of* Learning
Chapter Opener • 30–40 min (TR page 303)			BLM 8–1 Chapter 8 Self-Assessment BLM 8–2 Chapter 8 Prerequisite Skills BLM 8–4 Chapter 8 Unit 4 Project BLM U4–2 Unit 4 Project Checklist		TR page 302 Chapter 8 Foldable, TR page 302	TR page 302	
8.1 Systems of Linear Equations and Graphs • 100–120 min (TR page 306)	Students should be familiar with • ordered pairs and tables of values • evaluating expressions • drawing a line graph • slope-intercept form of the equation of a line • isolating a variable • evaluating expressions	• 0.5-cm grid paper • ruler • coloured pencils • computer with graphing or spreadsheet software	BLM 8–3 Chapter 8 Warm-Up BLM 8–4 Chapter 8 Unit 4 Project BLM 8–5 Section 8.1 Extra Practice TM 8–1 How to Do Page 420 Example 2 Using TI-Nspire™ TM 8–2 How to Do Page 420 Example 2 Using Microsoft® Excel	**Essential:** #1, 3, 5, 6, 7b), d), 8a), 10, 12, 16, 22 **Typical:** #1–5, 7–11, 13–16, 21, 22 **Extension/Enrichment:** #14, 16, 17–20, 23	TR pages 307, 315 Chapter 8 Foldable, TR page 302	TR pages 311, 312, 314, 315	
8.2 Modelling and Solving Linear Systems • 100–120 min (TR page 316)	Students should be familiar with • drawing a line graph • point of intersection • algebraic modelling • evaluating expressions • rate of change	• map of Canada • ruler • grid paper or computer with graphing software	BLM 8–3 Chapter 8 Warm-Up BLM 8–4 Chapter 8 Unit 4 Project BLM 8–6 Section 8.2 Extra Practice	**Essential:** #1, 3–5, 8, 9, 12, 23 **Typical:** #1 or 2, 4, 6, 7, 9, 10 or 11, 12, 13, 15 or 16, 22, 23 **Extension/Enrichment:** #9, 11, 12, 14, 17 or 18, 19–22, 24	TR pages 317, 323 Chapter 8 Foldable, TR page 302	TR pages 320, 323	
8.3 Number of Solutions for Systems of Linear Equations • 100–120 min (TR page 324)	Students should be familiar with • drawing a line graph • parallel lines • algebraic modelling • reducing equations to lowest terms • isolating a variable	• stopwatch or other timer or clock showing seconds • measuring tape • grid paper and coloured pencils • computer with graphing software • graphing calculator	BLM 8–3 Chapter 8 Warm-Up BLM 8–7 Section 8.3 Extra Practice	**Essential:** #1, 2, 4, 5, 7, 9, 12, 19, 20 **Typical:** #1, 3, 4, 6, 9, 10, 12, 13, 19–22 **Extension/Enrichment:** #6, 8, 11, 12, 14–17, 18, 21, 22	TR pages 326, 330 Chapter 8 Foldable, TR page 302	TR pages 328, 330	
Chapter 8 Review • 60–90 min (TR page 331)		• grid paper • ruler • graphing calculator or computer with graphing software	BLM 8–5 Section 8.1 Extra Practice BLM 8–6 Section 8.2 Extra Practice BLM 8–7 Section 8.3 Extra Practice	Have students do at least one question related to any concept, skill, or process that has been giving them trouble.	Chapter 8 Foldable, TR page 302	TR page 332	
Chapter 8 Practice Test • 60–90 min (TR page 333)		• grid paper • ruler	BLM 8–8 Chapter 8 Test BLM 8–9 Chapter 8 BLM Answers	Provide students with the number of questions they can comfortably do in one class. Choose at least one question for each concept, skill, or process. **Minimum:** #1–9	TR page 334		TR page 334 BLM 8–8 Chapter 8 Test