Lesson 8.2: Solving Systems of Linear Equations by Substitution

Complete the *Practice* below. When you have completed all the questions for *Lesson 8.2 Practice – III* with your best work, mark your work by first comparing your answers to the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Practice – III

1. Solve and verify each of the following systems of linear equations.

   a. $y = 2x$ and $3x + y = -5$

   b. $x + 2y = 2$ and $x - 2y = 6$

c. $y = \frac{1}{2}x + 1$ and $y = -\frac{3}{2}x - 1$

d. $6a - 2b - 8 = 0$ and $7b - 14a + 26 = 0$

2. Jakub attempted to solve the system of equations $5x + y + 20 = 0$ and $2x + 2y + 9 = 0$. His work is shown.

$$5x + y + 20 = 0$$
$$y = -5x - 20$$

$$5x + (-5x - 20) + 20 = 0$$
$$0 = 0$$

Uneasy about the result, Jakub graphed the relations and found the two lines intersect at (–3,–6).

a. What error did Jakub make?

b. Suggest to Jakub a general strategy that he can always use to solve linear systems of equations by substitution.

3. a. Explain how a solution to a system of linear equations can be verified algebraically.

b. Explain how a solution to a system of linear equations can be verified graphically.

c. Describe an advantage to verifying a solution using each method.

4. Glen and Warren competed in a cycling race where participants began the race at different locations, based on their previous cycling performances. Glen's position t hours after the race began is represented by $d = 32t + 14$ and Warren's position is represented by $d = 29t + 12$.

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a. If the race was 100 km long, what are the domain and range of Glen's relation?

b. Solve the system of equations.

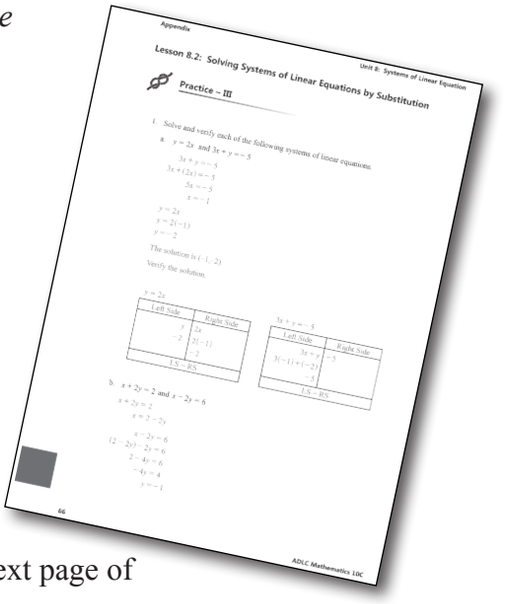
c. Explain the meaning of the solution.

Mark your work for *Lesson 8.2 Practice – III* using the solutions provided in the *Appendix*. Then, apply the rubric found at the beginning of the *Workbook*.

Transfer your self-assessed mark to the front cover of the *Workbook*.

My self-assessed mark on *Lesson 8.2 Practice – III* is _____.

Reflect on your understanding of the concepts addressed in the *Practice* exercises in the table provided.


Appendix

Unit 8: Systems of Linear Equation

Lesson 8.2: Solving Systems of Linear Equations by Substitution

Practice – III

1. Solve and verify each of the following systems of linear equations.

a. $y = 2x$ and $3x + y = -5$

$3x + y = -5$

$3x + (2x) = -5$

$5x = -5$

$x = -1$

$y = 2x$

$y = 2(-1)$

$y = -2$

The solution is $(-1, -2)$

Verify the solution.

$y = 2x$

Left Side	Right Side
y	$2x$
-2	$2(-1)$
	-2
LS = RS	

$3x + y = -5$

Left Side	Right Side
$3x + y$	-5
$3(-1) + (-2)$	
-5	
LS = RS	

b. $x + 2y = 2$ and $x - 2y = 6$

$x + 2y = 2$

$x = 2 - 2y$

$x - 2y = 6$

$(2 - 2y) - 2y = 6$

$2 - 4y = 6$

$-4y = 4$

$y = -1$

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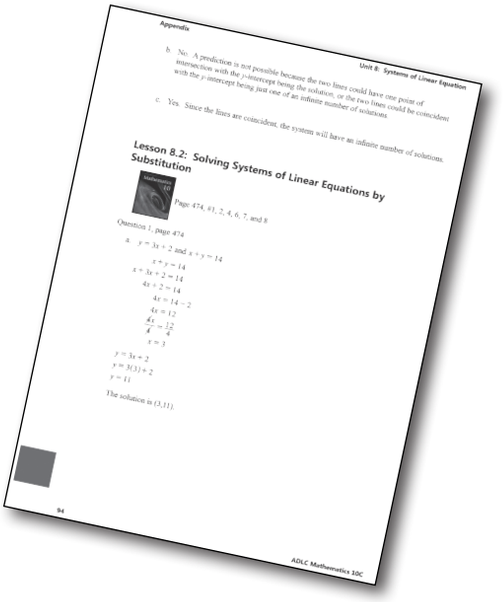
You may proceed to *Explore Your Understanding Assignment* on the next page of this *Workbook*.

Note: Before you complete *Explore Your Understanding*, you may review your skills and get more practice by completing the following problems in *Mathematics 10*.

- Page 474, #1, 2, 4, 6, 7, and 8

Check your work in *Enhance Your Understanding*.


Appendix

Unit 8: Systems of Linear Equation

b. No. A prediction is not possible because the two lines could have one point of intersection with the y-intercept being the solution, or the two lines could be coincident with the y-intercept being just one of an infinite number of solutions.

c. Yes. Since the lines are coincident, the system will have an infinite number of solutions.

Lesson 8.2: Solving Systems of Linear Equations by Substitution

Mathematics 10

Page 474, #1, 2, 4, 6, 7, and 8

Question 1, page 474

a. $y = 3x + 2$ and $x + y = 14$

$x + y = 14$

$x + 3x + 2 = 14$

$4x + 2 = 14$

$4x = 14 - 2$

$4x = 12$

$\frac{4x}{4} = \frac{12}{4}$

$x = 3$

$y = 3x + 2$

$y = 3(3) + 2$

$y = 11$

The solution is $(3, 11)$.

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