Lesson 7.2: Solving Systems of Equations Algebraically

Complete the *Practice* below. When you have completed all the questions for *Lesson 7.2 Practice – II* with your best work, mark your work by first comparing your answers to the solutions provided in *Appendix 2: Solutions*. Then, apply the rubric found at the beginning of the *Workbook*.

Practice – II

1. Solve each system of equations algebraically. Verify the solution(s).

   a. $\begin{cases} y = x^2 - 4 \\ 22 + y = 3x^2 \end{cases}$

b. $\begin{cases} y = x^2 + 2 \\ y = x^2 + 3 \end{cases}$

c. $\begin{cases} y = (x - 12)^2 - 5 \\ y + 14x = 114 \end{cases}$

d. $\begin{cases} 0 = 5x^2 - 20x - y - 231 \\ y = 23 - 4x \end{cases}$

2. Explain how the solution to a system of equations can be verified graphically using technology.

3. Verona is designing a pair of fireworks. She would like the user to be able to light the pair two seconds apart, and have them explode in the sky at approximately the same time and height. To do this, she will put a larger lifting charge in one firework and use different delay fuses. The height, h, of each shell at t seconds after the first shell is launched is modelled by the following system:

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Shell 1: $h = -4.9t^2 + 65t$
Shell 2: $h = -4.9t^2 + 90t - 160$

a. For how long should Verona set the delay fuse on each shell? (How long after each shell is launched should it explode?) Round your answer to the nearest tenth of a second.

b. At what height, rounded to the nearest metre, will the shells explode?

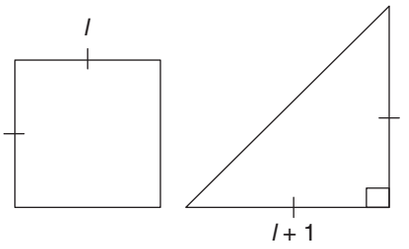
4. Recall, from *Practice I* (question 6), the equations $y = ax$ and $y = x^2$, which form a system that intersects at the point (0, 0) for any a-value. The question asked for a prediction of whether or not any non-zero a-value would lead to a single solution.

   a. Explain why it may be easier to use algebra than a graph to determine the number of solutions to the system for different a-values.

   b. Solve the system algebraically.

   c. Describe the number of solutions the system will have for different a-values.

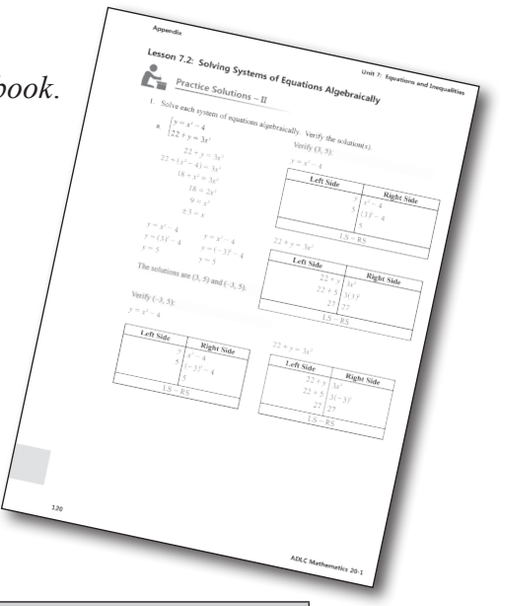
5. The two shapes shown have the same area. Determine the value of l.



Mark your work for *Lesson 7.2 Practice – II* using the solutions provided in *Appendix 2: Solutions*. 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 7.2 Practice – II* is _____.


Appendix

Unit 7: Equations and Inequalities

Lesson 7.2: Solving Systems of Equations Algebraically

Practice Solutions – II

1. Solve each system of equations algebraically. Verify the solution(s).

a. $\begin{cases} y = x^2 - 4 \\ 22 + y = 3x^2 \end{cases}$

$22 + y = 3x^2$

$22 + (x^2 - 4) = 3x^2$

$18 + x^2 = 3x^2$

$18 = 2x^2$

$9 = x^2$

$\pm 3 = x$

$y = x^2 - 4$ $\quad$ $y = x^2 - 4$

$y = (3)^2 - 4$ $\quad$ $y = (-3)^2 - 4$

$y = 5$ $\quad$ $y = 5$

The solutions are (3, 5) and (−3, 5).

Verify (3, 5):

$y = x^2 - 4$

Left Side	Right Side
y	$x^2 - 4$
5	$(3)^2 - 4$
	5

LS = RS

$22 + y = 3x^2$

Left Side	Right Side
$22 + y$	$3x^2$
$22 + 5$	$3(3)^2$
27	27

LS = RS

Verify (−3, 5):

$y = x^2 - 4$

Left Side	Right Side
y	$x^2 - 4$
5	$(-3)^2 - 4$
	5

LS = RS

$22 + y = 3x^2$

Left Side	Right Side
$22 + y$	$3x^2$
$22 + 5$	$3(-3)^2$
27	27

LS = RS

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

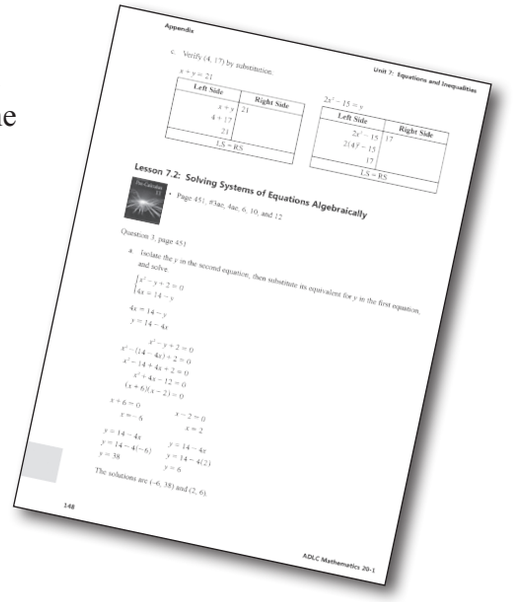
Question Number	Got it!	Almost there…	Need to retry or ask for help.	Similar questions from *Pre-Calculus 11*
1				p.451 #3ae, 4ae
2				p.452 #6
3				p.453 #12
4				
5				p.453 #10

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 *Pre-Calculus 11*.

- Page 451, #3ae, 4ae, 6, 10, and 12

Check your work in *Enhance Your Understanding*.


Appendix

Unit 7: Equations and Inequalities

c. Verify (4, 17) by substitution.

$x + y = 21$

Left Side	Right Side
$x + y$	21
$4 + 17$	
21	

LS = RS

$2x^2 - 15 = y$

Left Side	Right Side
$2x^2 - 15$	17
$2(4)^2 - 15$	
17	

LS = RS

Lesson 7.2: Solving Systems of Equations Algebraically

Page 451, #3ae, 4ae, 6, 10, and 12

Question 3, page 451

a. Isolate the y in the second equation, then substitute its equivalent for y in the first equation, and solve.

$\begin{cases} x^2 - y + 2 = 0 \\ 4x = 14 - y \end{cases}$

$4x = 14 - y$

$y = 14 - 4x$

$x^2 - y + 2 = 0$

$x^2 - (14 - 4x) + 2 = 0$

$x^2 - 14 + 4x + 2 = 0$

$x^2 + 4x - 12 = 0$

$(x + 6)(x - 2) = 0$

$x + 6 = 0$ $\quad$ $x - 2 = 0$

$x = -6$ $\quad$ $x = 2$

$y = 14 - 4x$ $\quad$ $y = 14 - 4x$

$y = 14 - 4(-6)$ $\quad$ $y = 14 - 4(2)$

$y = 38$ $\quad$ $y = 6$

The solutions are (−6, 38) and (2, 6).

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