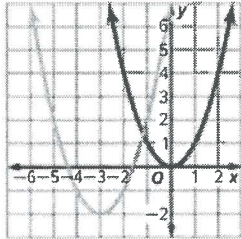


Unit 9 Quadratic Packet Review

47. Luis graphed the parent quadratic function as shown. Then he graphed a second function that is a translation of the parent graph 2 units down and 3 units to the left. Which is an equation for the second graph? **1.8 F.IF.7a, F.BF.3**



- A $f(x) = x^2 - 6x + 7$
 B $f(x) = x^2 - 6x + 11$
 C $f(x) = x^2 + 6x + 7$
 D $f(x) = x^2 + 6x + 11$
48. The graph of the function $f(x) = x^2$ is reflected across the x -axis and compressed vertically. Which of the following could be the equation for the graph? Select all that apply. **1.8 F.BF.3**

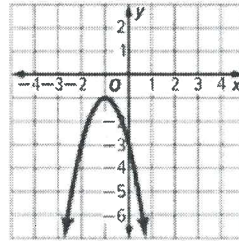
- A $f(x) = \frac{3}{2}x^2$
 B $f(x) = -\frac{3}{2}x^2$
 C $f(x) = \frac{1}{3}x^2$
 D $f(x) = -\frac{1}{3}x^2$
 E $f(x) = -\frac{2}{3}x^2$
 F $f(x) = \frac{2}{3}x^2$

49. The graph of $f(x) = x^2$ is reflected across the x -axis and translated to the left 4 units. What is the value of h when the equation of the transformed graph is written in vertex form? **1.8 F.BF.3**

-4

Write the new equation for $g(x)$ be careful of where you put h

50. The graph of a quadratic function $g(x)$ is shown below.



Which statement about the relationship between the graph of $g(x)$ and the graph of the parent function $f(x) = x^2$ is not true? **1.8 F.IF.7a, F.BF.3**

- A $g(x)$ is a vertical stretch of the graph of $f(x) = x^2$.
 B $g(x)$ is a reflection across the x -axis of the graph of $f(x) = x^2$.
 C In vertex form, the equation of the function is $g(x) = -2(x - 1)^2 - 1$.
 D In standard form, the equation of the function is $g(x) = -2x^2 - 4x - 3$.

51. **MULTI-STEP** The ideal weight of a kitten in pounds is modeled by the function $g(x) = 0.0009(x + 7.05)^2 - 0.071$, where x is the age of the kitten in weeks. **1.7 F.BF.3**

- Determine the value of a in $g(x)$.
- Determine the value of h in $g(x)$.
- Determine the value of k in $g(x)$.
- Select all transformations in $g(x)$ as it relates to the parent function.
 - A reflected across the x -axis
 - B compressed vertically
 - C stretched vertically
 - D translated right
 - E translated left
 - F translated up

48. Sean solved a quadratic equation by graphing. The equation has no real solution. Which statement best describes Sean's graph? **MP** 6.7

- A The graph has exactly two x -intercepts.
- B The graph has exactly one x -intercept.
- C The graph has exactly one x -intercept of 0.
- D The graph has no x -intercepts.

49. Which quadratic equations have solutions of -2 and 5 ? Select all that apply. **MP** 1

- A $x^2 - 3x - 10 = 0$
- B $x^2 + 3x = 10$
- C $2x^2 - 6x = 20$
- D $-x^2 + 10 = 3x$
- E $-x^2 + 3x + 10 = 0$

66. Suppose a maple tree has a leaf that is 60 feet from the ground. The equation $h = -16t^2 + 60$ describes the height h , in feet, of the leaf t seconds after it falls from the tree. How many seconds will it take the leaf to fall to the ground? **MP** 4, 6

- A $-\frac{\sqrt{15}}{2}$ s
- B $\frac{15}{4}$ s
- C $\frac{\sqrt{15}}{4}$ s
- D $\frac{\sqrt{15}}{2}$ s

46a. **MULTI-STEP** Consider $3x^2 - 24x = 51$. **MP** 1, 7

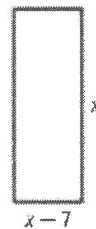
a. What is the first step to solve the equation by completing the square?

Divide the equation by 3

b. What value should be added to each side to complete the square.

- A -16
- B -4
- C 16
- D 144

62. The rectangle shown has an area of 60 square centimeters. **MP** 5



a. What is the length x of the rectangle?

- A 5 cm
- B 12 cm
- C 33.5 cm
- D 46 cm

b. Find the perimeter of the rectangle.



63. A soccer ball is kicked into the air. The height of the soccer ball can be modeled by the equation $h = -16t^2 + 24t$, where h is the height of the ball at t seconds. What is the value of t when $h = 0$? Select all that apply. **MP** 1, 4

- A 0 s
- B 0.5 s
- C 1 s
- D 1.5 s
- E 2 s

68. Which are solutions of the equation $(x - 2)^2 = 16$? Select all that apply. **MP** 7

- A -4
- B -2
- C 2
- D 4
- E 6

65. Solve $2(x^2 + 8) = 16$. **MP** 6,7

$\{-2, 2\}$

47. Which of the following is least likely to be a step in solving the equation $x^2 + 10x + 10 = 66$ by completing the square? **MP** 3,7

- A Subtract 10 from both sides of the equation.
- B Subtract 25 from both sides of the equation.
- C Add $\left(\frac{10}{2}\right)^2$ to both sides of the equation.
- D Factor $x^2 + 10x + 25$.

48. Which equation has no real solutions?

MP 1,7

- A $x^2 - 2x = 2$
- B $x^2 - 2x = 3$
- C $x^2 - 3x = -2$
- D $x^2 + 3x = -3$

49. Which equation has solutions of -1 and 3 ?

MP 1,7

- A $x^2 - x - 7 = -4$
- B $x^2 - 2x + 7 = -4$
- C $x^2 - 2x - 7 = -4$
- D $2x^2 - 4x - 14 = -4$

60. Which equation has no real solutions? **MP** 1

- A $2x^2 - 4x = 5$
- B $2x^2 + 4x = 5$
- C $-2x^2 + 4x = 5$
- D $-2x^2 + 4x = -5$

53. Chris solved the equation $x^2 - 6x - 2 = 6$ by completing the square. Which best describes the solution or solutions? **MP** 6

- A Rounded to the nearest tenth, the solutions are -4.1 and 4.1 .
- B The solution is 3 .
- C Rounded to the nearest tenth, the solutions are -1.1 and 7.1 .
- D This equation has no real solutions.

50. What value should be added to $x^2 - 20$ in order to complete the square? **MP** 2

100

51. Solve $-3x + 30x - 72 = 0$ by completing the square. **MP** 2

$\{4, 6\}$

64. A piece of scaffolding falls to the ground from a height of 50 feet. The situation is modeled by the function $h = -16t^2 + 50$, where h is the height in feet and t is the time in seconds. About how many seconds is the best estimate for the time it will take for the scaffolding to hit the ground? **MP** 4,6

1.8 seconds

59. MULTI-STEP Gabrielle is using the Quadratic Formula to solve the equation $8x^2 - 3x = 9$. Her work so far is shown below.

3,6

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-(-3) \pm \sqrt{(-3)^2 - 4(8)(9)}}{2(8)}$$

$$\frac{3 \pm \sqrt{-9 - 288}}{16}$$

a. What errors, if any, did Gabrielle make when using the Quadratic Formula to solve this equation? Select all that apply.

A There are no errors.

B She made a sign error when substituting for a .

C She made a sign error when substituting for b .

D She made a sign error when substituting for c .

E She mixed up the values of a , b , and c when substituting.

F She squared the value of b incorrectly.

b. Which are the correct solutions of $8x^2 - 3x = 9$? Select all that apply.

A 0.9

B 1.3

C 0

D -1.3

E -0.9

F no solution

c. What are two strategies Gabrielle could have used to reduce errors in this calculation?

37. The quadratic equation $y = x^2 + 1$ is part of a linear and quadratic system of equations. If the system has two solutions, select all of the linear equations that could complete the system. 1,3

A $y = 1$

B $y = 3$

C $y = x$

D $y = x + 2$

E $y = x - 2$

F $y = -x + 3$

61. Examine the quadratic equation $3x^2 - 4x + 2 = 0$.

6

a. What do you know about the discriminant of $3x^2 - 4x + 2$?

A It is a negative integer.

B It is a positive integer.

C It is an irrational number.

D It is a rational number.

b. What is one solution of $3x^2 - 4x + 2$?

A about 0.2

B about 0.3

C about 1.7

D There is no solution.

62. Which equation has solutions, rounded to the nearest tenth, of -2.1 and 2.4? 6

A $3x^2 - x - 15 = 0$

B $2x^2 - x - 15 = 0$

C $3x^2 - 4x + 2 = 0$

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

63. For what value of c does the quadratic equation $-2x^2 + 12x - c = 0$ have exactly one real solution? 6.7

A $c = 3$

B $c = 18$

C $c = -18$

D $c = 72$

40. Which system has $(1, -1)$ as a solution? 7

A $y = x^2 - 3x + 1$
 $y = x + 2$

B $y = x^2 + 3x - 1$
 $y = x - 2$

C $y = x^2 - 2$
 $y = x - 2$

D $y = x^2 - 2$
 $y = -x + 2$

34. Which ordered pair is a solution of the following system? **7**

$$y = x^2 + 7x + 10$$

$$y = x + 1$$

- A (-3, -2) C (3, 4)
 B (3, 40) D (-4, -3)

35. Which of the following are solutions of the given system? Select all that apply. **7**

$$y = x^2 + 7x + 12$$

$$y = 2x + 8$$

- A (-4, 0)
 B (-1, 6)
 C (1, 10)
 D (4, 16)
 E (-1, -4)
 F (12, 8)

36. In the system shown below, k is a constant. If the system has exactly one solution, what is the value of k ? **2**

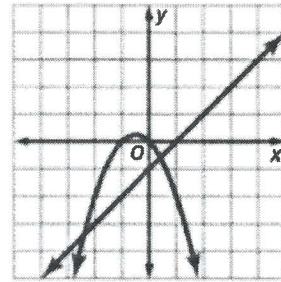
$$y = x^2 - 3x + 7$$

$$y = x + k$$

- A -4 C 3
 B 2 D 7

C. $y = 1.75$

38. The graph below shows the system $y = x - 1$ and $y = -x^2 - x$. Based on the graph, which of the following is a solution of the system, assuming coordinates are rounded to the nearest tenth? **1,6**



- A (0.4, -2.4)
 B (-1.0, -3.4)
 C (-0.5, 0.25)
 D (-2.4, -3.4)

39. **MULTI-STEP** An animator is using a coordinate plane to create a cartoon about outer space. The path of a comet is represented by $y = x^2 - 3x + 4$. The path of a rocket is represented by $y - x = 1$. **4**

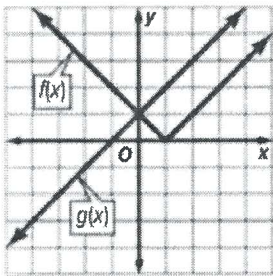
- a. Graph the equations in the system on the same coordinate plane.
 b. Is it possible that the rocket and the comet will collide? If so, what are the coordinates at which this might happen? If not, why not?
 c. The animator wants to change the path of the rocket so that there is exactly one point at which the rocket and the comet could collide. How can the animator change the equation for the path of the rocket?



b. Yes there are two places where they can collide.
 $(3, 4) \neq (1, 2)$

53. Given that $f(x) = 2x^2 - 4x$ and $g(x) = 6x - 5$, which of the following is $(f \cdot g)(x)$? 7
- A $(f \cdot g)(x) = 2x^2 + 2x - 5$
- B $(f \cdot g)(x) = 12x^3 - 34x^2 + 20x$
- C $(f \cdot g)(x) = 12x^3 - 24x^2 + 20x$
- D $(f \cdot g)(x) = 2x^2 - 10x + 5$

54. The graphs of $f(x)$ and $g(x)$ are shown. What is $(f - g)(-2)$? 1



- A -4
- B -2
- C 3
- D 4

55. Given that $f(x) = 3x + 4$, $g(x) = -x^2 + 2x - 1$, and $h(x) = 10$, which of the following are quadratic functions? 7

- A $(f + g)(x)$
- B $(f - g)(x)$
- C $(f \cdot g)(x)$
- D $(f + h)(x)$
- E $(g \cdot h)(x)$
- F $(g - h)(x)$

56. What is the value of $(f + g)(3)$ if $f(x) = 2^x - 1$ and $g(x) = 3^x$? 7

57. MULTI-STEP In 2010, the population of Oakville was 82,400 and increasing at a rate of 2.5% per year. In 2010, the population of Elmwood was 75,600 and decreasing by an average of 300 residents each month. 4

- a. Write a function $f(x)$ to represent the population of Oakville x years after 2010.

$$f(x) = 82,400(1.025)^x$$

- b. Write a function $g(x)$ to represent the population of Elmwood x years after 2010.

$$g(x) = 75,600 - 300x$$

- c. Find $(f - g)(x)$ and explain what this function represents.

$$82,400(1.025)^x + 300x - 75,600$$

- d. Find $(f - g)(6)$ and explain what it represents.

21,759 more residents of Oakville than Elmwood in 2016

58. Based on the table of values, what is $(f \cdot g)(2)$? 1.7

x	$f(x)$	$g(x)$
-2	2	-8
-1	-3	3
0	2	-5
1	0	2
2	4	-3

- A -16
- B -12
- C 1
- D 7

59. For which pair of functions does $(f - g)(x) = x$? 7

- A $f(x) = 2x^2 + 2x - 5$; $g(x) = -2x^2 - x + 5$
- B $f(x) = -4x^2 - x + 1$; $g(x) = -4x^2 + x + 1$
- C $f(x) = -x^2 + 3x - 2$; $g(x) = -x^2 + 2x - 2$
- D $f(x) = x^2 + 10x + 4$; $g(x) = -x^2 + 9x + 4$