

Name SINGLETON

Date _____

Quadratics Unit Test Study Guide- ACTIVE

1. How many root(s) do the equations each have?

A. $f(x) = 20x^2 - 5$

$5(4x^2 - 1)$
 $5(2x + 1)(2x - 1)$ 2
 $x = -\frac{1}{2} \quad x = \frac{1}{2}$

B. $f(x) = 9x^2 + 36$

$9(x^2 + 4)$

0

2. What are the solutions to the equation

$x^2 + 2x - 18 = 81$

$x^2 + 2x - 99 = 0$
 $(x^2 - 9x) + (11x - 99)$
 $x(x - 9) + 11(x - 9)$ { -11, 9 }
 $(x + 11)(x - 9)$
 $x + 11 = 0 \quad x - 9 = 0$
 $x = -11 \quad x = 9$

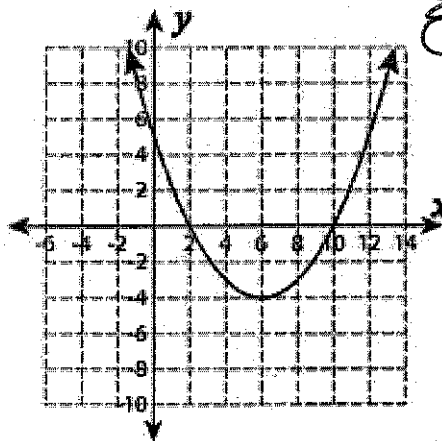
3. Complete the following sentence:

The vertex of the graph of the equation $y = 3x^2 - 5x + 2$ is

a minimum

(a maximum, a minimum, neither a maximum or minimum, both a maximum and a minimum)

4. What is the solution(s) of the function graphed below?



{ 2, 10 }

5. What is the distance between the y-intercept of the function $f(x) = 2x^2 + 5x + 7$ and the y-intercept of the linear function g represented by the table below?

x	g(x)
-6	12
-4	2
4	-38
6	-48

$-2 \quad -8$
 $0 \quad -18$

$2x^2 + 5x + 7$
 $2 + 5 + 7$ plug in zero for x

14

$14 - (-18)$

32

Final answer

6. What is the larger of two consecutive negative even integers whose product is 528?

$x, x + 2$

$x(x + 2) = 528$

$x^2 + 2x - 528 = 0$

$(x^2 - 22x) + (24x - 528)$

$x(x - 22) + 24(x - 22)$

$(x + 24)(x - 22)$

$x + 24 = 0$

$x = -24$

$x - 22 = 0$

$x = 22$

-24, -22

-22

$ac = -528$
 $-22 \mid 24$

7. What is the maximum value of the function

$$f(x) = -x^2 - 2x + 24$$

A.O.S

$$-\frac{b}{2a} = \frac{2}{2(-1)} = -1$$

$$-(-1)^2 - 2(-1) + 24$$

$$-1 + 2 + 24$$

$$25$$

$(-1, 25)$

8. The sum of a number and its square is 42. What is the number?

$$x^2 + x = 42$$

$$x^2 + x - 42 = 0$$

$$(x^2 - 6x)(+7x - 42)$$

$$x(x-6) 7(x-6)$$

$$(x+7)(x-6)$$

$$x = -7 \quad x = 6$$

$-7, 49$
 $6, 36$

9. Baxter is pouring a new driveway at his house. The length of the driveway is 3 feet longer than the width. The area is 40 square feet. What is the length and width of the driveway?

$$w = \text{width} \quad w + 3 = \text{length}$$

$$w(w+3) = 40$$

$$w^2 + 3w - 40 = 0$$

$$(w^2 - 5w)(+8w - 40)$$

$$w(w-5) 8(w-5)$$

$$(w+8)(w-5)$$

$$w = -8 \quad w = 5$$

↑

can't have a negative width

width
5ft
length
8ft

10. Jesse threw a baseball into the air with an initial upward velocity of 31 feet per second. The height, $h(t)$, in feet of the ball above the ground can be modeled by $h(t) = -16t^2 + 31t + 5$, where t is the time in seconds after he threw the ball. How long does it take the ball to reach its maximum height?

A.O.S.

$$-\frac{b}{2a} = \frac{-31}{2(-16)} = \frac{-31}{-32} = \frac{31}{32} \text{ sec}$$

11. Find three consecutive odd integers such that the product of the first and third is one more than four times the second.

$$x(x+4) = 1 + 4(x+2)$$

$$x^2 + 4x = 4x + 9$$

$$-4x - 9 \quad -4x \quad / 9$$

$$x^2 - 9 = 0$$

$$(x+3)(x-3)$$

$$x = -3 \quad x = 3$$

$-3, -1, 1$

$3, 5, 7$

12. What is the sum of the roots of the following equation?

$$f(x) = x^2 + 10x + 4 = -5$$

$$x^2 + 10x + 9 = 0$$

$$(x^2 + 9x)(x+9)$$

$$x(x+9) 1(x+9)$$

$$(x+1)(x+9)$$

$$x = -1 \quad x = -9$$

$(-1) + (-9)$

-10

$x = \text{students}$ $y = \text{teachers}$

13. Write the equation of a line in slope-intercept form that has a slope of $\frac{2}{3}$ and passes through the point $(-8, -12)$.

$$y + 12 = \frac{2}{3}(x + 8)$$

$$y + 12 = \frac{2}{3}x + \frac{16}{3}$$

$$\begin{array}{r} -12 \\ -12 \end{array} \qquad \qquad \begin{array}{r} -12 \\ -12 \end{array}$$

$$\boxed{y = \frac{2}{3}x - \frac{20}{3}}$$

14. A group of students and teachers are attending the Rose Bowl football game in California. The tickets for students are \$95 and \$135 for teachers. If the number of students is one more than 3 times the number of teachers and they paid \$5,135 to get into the game, how many students went to the game?

$$x = 1 + 3y$$

$$95x + 135y = 5135$$

$$95(1 + 3y) + 135y = 5135$$

$$95 + 285y + 135y = 5135$$

$$95 + 420y = 5135$$

$$420y = 5040 \quad y = 12$$

$$x = 1 + 3(12)$$

$$x = 37$$

37 Students

15. Amanda has a rectangle and a right triangle

- The length of the rectangle is 6 more than its width, w
- The length of the shorter leg of the triangle is twice the rectangle's width.
- The length of the longer leg of the triangle is 9 more than the length of the rectangle.

What function, $f(w)$, represents the combined area of the rectangle and the triangle?

$A = w^2 + 6w$

$$A = \frac{2w(w+15)}{2} = w^2 + 15w$$

$$w^2 + 6w + w^2 + 15w = \boxed{2w^2 + 21w}$$

16. A square is altered so that one dimension is increased by 7, while the other dimension is decreased by 1. The area of the resulting rectangle is 105. Find the area of the original square.

$$(x-1)(x+7) = 105$$

$$x^2 + 7x - x - 7 = 105$$

$$x^2 + 6x - 112 = 0$$

$$(x^2 - 8x)(+14x - 112)$$

$$x(x-8) \quad 14(x-8)$$

A = 64

8

$$(x+14)(x-8)$$

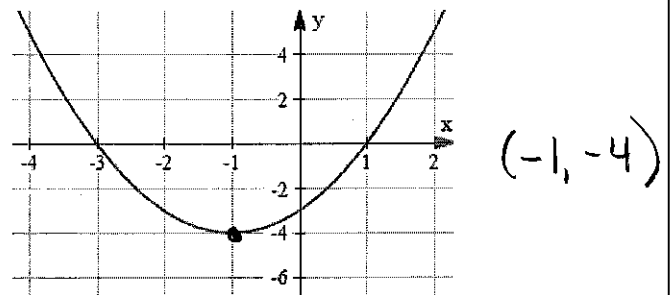
$$x+14=0 \quad x-8=0$$

$$x=-14 \quad x=8$$

17. Which of the following functions does not have a minimum?

- A. $f(x) = 3(x-2)^2 - 9$
 B. $f(x) = 5x^2 + 3x - 1$
 C. $f(x) = -4x^2 - 4x + 6$
 D. $f(x) = 8(x-6)(x+6)$

18. What is the vertex of the parabola?



19. Find the roots for the following equation: $(x-5)^2 + 13 = 62$

$$(x-5)^2 + 13 = 62$$

$$x^2 - 10x + 25 + 13 = 62$$

$$x^2 - 10x - 24 = 0$$

$$(x^2 - 12x)(+2x - 24)$$

$$x(x-12) \quad 2(x-12)$$

$$(x+2)(x-12)$$

$$x = -2 \quad x = 12$$

$$x = \{-2, 12\}$$

20. Suppose the equation $f(t) = -16t^2 + 96t$ approximates (in yards) the height, $f(t)$, that an object thrown out of a window will reach after t seconds.

Part A: How long will it take for the object to fall to the ground?

$$-16t^2 + 96t$$

$$-16t(t - 6)$$

$$-16t = 0 \quad t - 6 = 0$$

$$t = 0 \quad t = 6$$

6 sec

Part B: Name the point at which the object starts to fall. (Provide the coordinates)

A.O.S. $-16(3)^2 + 96(3)$
 144

$$\frac{-b}{2a} = \frac{-96}{2(-16)} = 3$$

(3, 144)

21. Given the equation $y = 8x^2 - 48x + 3$

Part A: What is the vertex?

A.O.S.

$$\frac{-b}{2a} = \frac{48}{16} = 3$$

(3, -69)

$$8(3)^2 - 48(3) + 3$$

$$72 - 144 + 3$$

$$-69$$

Part B: Is this a maximum or a minimum?

Minimum

A-value is positive

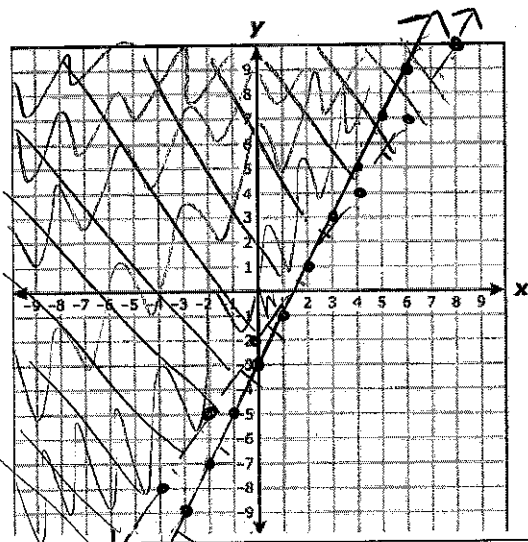
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22. Which quadrant(s) are the solutions for the following system of inequalities located in?

$$-4y \leq -8x + 12 \quad 8x - 4y \leq 12$$

$$y \geq 2x - 3 \quad y + 2 \geq \frac{3}{2}x \quad y \geq \frac{3}{2}x - 2$$

I, II, III, IV



23. Suppose the equation

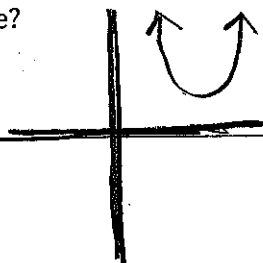
$v = 15.2x^2 - 395x + 4500$ represents the value of a motorcycle from 1999 to 2030. What year did the car have the least value?

(Let $x = 0$ be 1999)

- A. 2002 $x = 3 \rightarrow \$ 3451.80$
- B. 2005 $x = 6 \rightarrow \$ 2677.20$
- C. 2011 $x = 12 \rightarrow \$ 1948.80$
- D. 2015 $x = 16 \rightarrow \$ 2071.20$

Plug in the x -value into the equation and locate the smallest value

24. If the value of a is positive and the vertex of the parabola is at $(8, 5)$, how many x -intercepts will the graph have?



No real roots

(Does not intersect with the x -axis)