Algebra 2 Worksheet 5.1 **Name:**_____

Find the solutions to $f(x) = 0$.

1. $f(x) = 4(x + 1)(x - 5)$

2. $f(x) = 2x^2 + 10x$

3. $f(x) = (2x + 1)(3x - 5)$

4. $f(x) = 2.1(x - 2.34)(x + 1)$

5. $f(x) = 3(5x + 6)(x - 7)$

6. $y = x^2 + 6x$

7. $f(x) = 3x^2 + 27x$

8. $y = 27x^2 + 3x$

9. $f(x) = 5x^2 + 6x$

10. $2x + 3 = y$

11. $20x = 5x^2$

12. $f(x) = 2(x + 1)^2 - 12$

13. $y = x^2 - 8x - 20$

14. $-3x^2 + 14 = 2$

15. $x^2 - x = 42$

16. $-4x^2 + 37 = 1$

17. $y = x^2 - 6.21x$

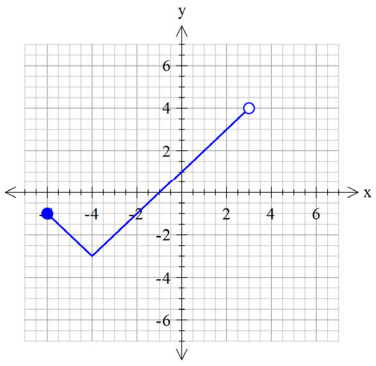
18. $x^2 + 13x + 10 = -32$

19. $(x - 5)^2 + 84 = 20$

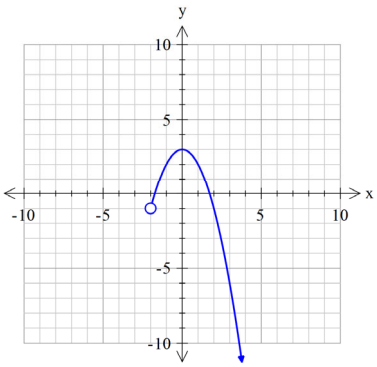
20. $x^2 = -7x - 12$

Describe the domain and range of the following functions in <u>interval notation</u>.

21.



22.

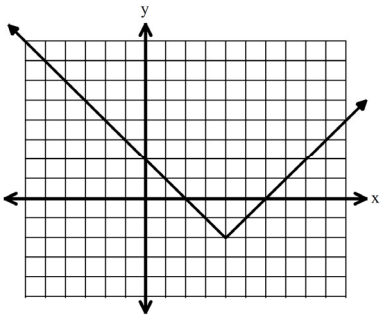


23. Given $f(x) = 3(x - 4) + 1$, identify the name of the parent function and describe how the graph is transformed from the parent function.

A. Quadratic Function with a vertical compression, translated right 4 and up 1
B. Quadratic Function with a vertical stretch, translated right 4 and up 1
C. Linear Function with a vertical compression, translated left 4 and up 1
D. Linear Function with a vertical stretch, translated right 4 and up 1

24. Which equation is obtained after the translation of the graph up 2 units and left 6 units?

A. $f(x) = |x - 2|$
B. $f(x) = |x| - 2$
C. $f(x) = |x + 2|$
D. $f(x) = |x| + 2$



25. Solve for y: $4 + yx + 2y = 3x + 4$

Algebra 2 Worksheet 5.2 **Name:**_____

Find the solutions to $f(x) = 0$.

1. $f(x) = x(x+3)(x-7)$

2. $f(x) = -2(x+3)^2 + 32$

3. $y = (3x+2)(4x-5)(x+4)$

4. $f(x) = x^3 + 3x^2 - 10x$

5. $y = -x^2 - 6x + 40$

6. $f(x) = x^3 + 2x^2 - 8x$

7. $x^3 + 10x^2 + 29x = 4x$

8. $2x^3 + 10x^2 = -8x$

10. $50x^4 = -5x^3$

11. $(x+3)^2 + 85 = 4$

12. $4x^2 - 3x^3 = 0$

13. $-3x^2 + 15x = 0$

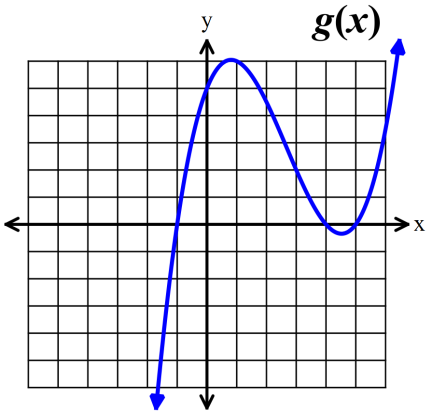
14. Which of the following could be the equation for $g(x)$?

A. $f(x) = 3(x-1)(x+4)(x+5)$

B. $f(x) = \frac{1}{4}(x+1)(x-4)(x-5)$

C. $f(x) = -x(x-1)(x+4)(x+5)$

D. $f(x) = x(x+1)(x-4)(x-5)$



15. What is the range of the function $g(x)$ from #14?

16. Do $f(x)$ and $g(x)$ cross the x-axis in the same places? $\begin{cases} f(x) = -x^2(x+15)(x-6) \\ g(x) = 5x(x+15)(x-6) \end{cases}$

17. The graph of $f(x) = x^2$ is vertically compressed by a factor of $\frac{1}{2}$ and translated to the right three units and down one unit to produce the function $g(x)$. Which of the following equations represents $g(x)$?

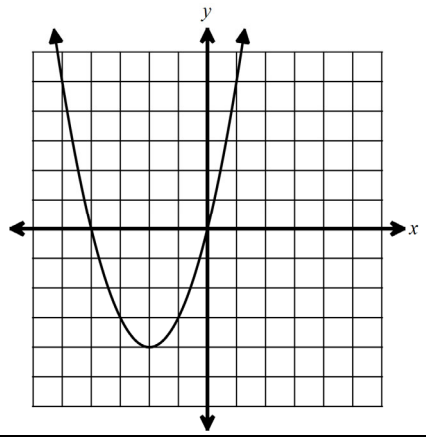
A. $g(x) = -\frac{1}{2}(x+3)^2 + 1$

C. $g(x) = \frac{1}{2}(x-3)^2 - 1$

B. $g(x) = -\frac{1}{2}(x+1)^2 + 3$

D. $g(x) = \frac{1}{2}(x-1)^2 - 3$

18. Compare the two functions represented below. Determine which of the following statements is true.

Function $f(x)$	Function $g(x)$
	$g(x) = (x-6)^2 - 4$

A. The functions have the same vertex.

B. The minimum value of $f(x)$ is the same as the minimum value of $g(x)$.

C. The functions have the same axis of symmetry.

D. The minimum value of $f(x)$ is less than the minimum value of $g(x)$.

Simplify.

19. $(2+3i)^2$

20. $\left(3-\sqrt{5}\right)\left(3+\sqrt{5}\right)$

21. $5i(6-11i)$

Algebra 2 Worksheet 5.3 **Name:**_____

Find the solutions to $f(x) = 0$.

1. $f(x) = 3x^2 - 7x - 6$

2. $f(x) = x^4 - 10x^2 + 9$

3. $x^2 - 85 = -4$

4. $32x^2 - 18 = f(x)$

5. $2x^2 + 2x = 12$

6. $y = x^4 - 2x^2 + 1$

7. $f(x) = 9x^4 - 16x^2$

8. $y = -x^6 + 36x^4$

9. $x^2 - 2x - 14 = -5x + 4$

10. $6x^2 - 5x = 4$

11. $-10x^2 - 6x + 4 = 0$

12. $-3x^3 + 243x = 0$

13. $3x^2 + 18x = f(x)$

14. $x^4 - 81 = 0$

15. $\begin{cases} f(x) = -(x-1)(x-5) \\ g(x) = x^2 - 6x + 13 \end{cases}$

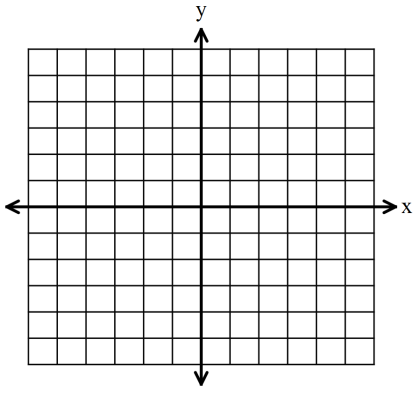
a.) Do $f(x)$ and $g(x)$ have the same vertex?

b.) Do $f(x)$ and $g(x)$ have the same axis of symmetry?

c.) Do $f(x)$ and $g(x)$ have the same range?

16. Graph the piecewise function.

$$f(x) = \begin{cases} -3 & x < -2 \\ -x + 1 & -2 \leq x < 3 \\ |x - 5| & x \geq 3 \end{cases}$$



Algebra 2 Worksheet 5.4 **Name:**_____

Solve each of the following quadratics using the quadratic formula. Simplify all answers, using *i* if needed.

1.) $x^2 - 4x - 5 = 0$

2.) $x^2 - 8x + 1 = 0$

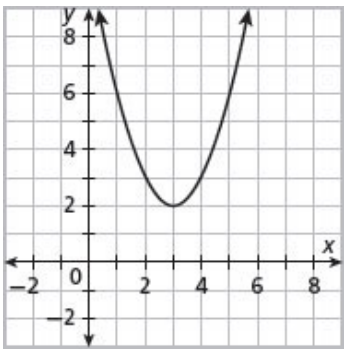
3.) $x^2 + 8x + 19 = 0$

4.) $-3r^2 = 6r - 10$

5.) $3 - 8v - 5v^2 = 2v$

6.) $-4x^2 + 2x = 5$

7.) The function $f(x)$ is graphed below. What are the solutions to $f(x) = 0$?



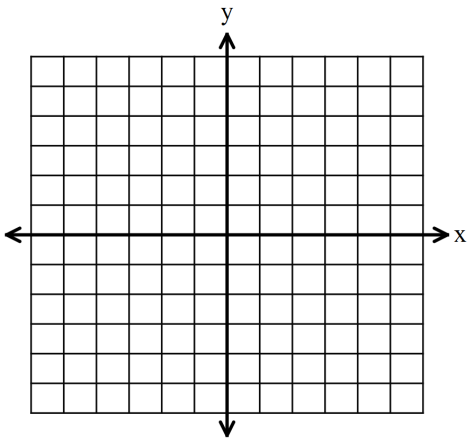
8.) Graph $f(x) = x^2 - 8x + 15$ and give the following information:
Hint: probably easiest to convert the equation to $y = a(x - h)^2 + k$ form

Vertex:

Min/Max:

y-intercept:

x-intercepts:



9.) The graph of $g(x) = -x^2 + 10x - 9$ models the height of one of the arches of a doorway, in feet. How wide is the doorway?

10.) What is the height of the doorway at the highest point?

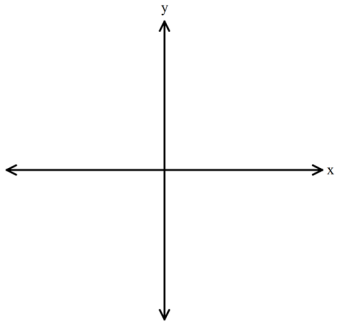
11.) The quadratic equation $y = x^2 - 10x + 21$ is shifted left 6 units and down 8 units. What is the new equation, written in vertex form?

Algebra 2 Worksheet 5.5 **Name**_____

1. Use a graphing calculator to solve the following system:

$$\begin{cases} f(x) = -x^2 + 4x + 11 \\ g(x) = 3x + 4 \end{cases}$$

2. Draw a sketch:



Solve each system of equations by any method of your choice.

3. $\begin{cases} f(x) = 3x^2 - 9x + 3 \\ g(x) = 6x + 3 \end{cases}$

4. $\begin{cases} x^2 + 4x - 3y = 6 \\ -x + y = 2 \end{cases}$

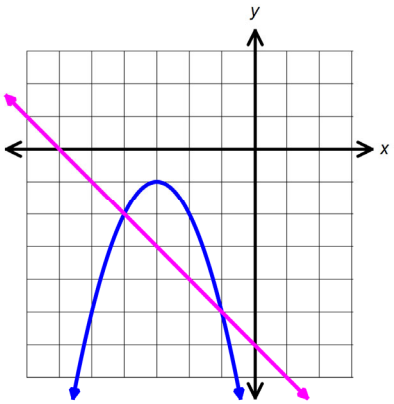
5. $\begin{cases} f(x) = -2x^2 + 4x + 1 \\ g(x) = -x + 3 \end{cases}$

6. $\begin{cases} x^2 + 6x - 8 = y \\ y = 4x + 7 \end{cases}$

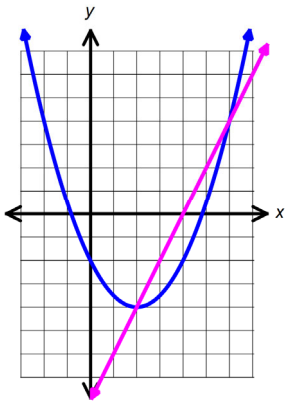
7. $\begin{cases} 6x^2 + 27x - 3y = 108 \\ 5x - y = 6 \end{cases}$

8. In the xy-plane, the parabola with equation $y = (x - 11)^2$ intersects the line with equation $y = 25$ at two points, A and B. What is the length of $\overline{AB}$?

9. Solve the system:



10. Solve the system:



11. Use the system of equations below. Which statement best describes the solution set of the system?

$$\begin{cases} x = 4 \\ y = 2 \end{cases}$$

A. The solution set is only the ordered pair (4, 2).
B. The solution set is all ordered pairs where $x = 4$; y can be any real number.
C. The solution set is all ordered pairs where $y = 2$; x can be any real number.
D. There is no solution to the system.

12. Which of the following systems of equations could a student use to write a quadratic function in standard form for the parabola passing through the points $(1, 4), (3, -2)$, and $(-2, 17)$?

A. $\begin{cases} a + 4b + c = y \\ 9a - 2b + c = y \\ -4a + 17b + c = y \end{cases}$

B. $\begin{cases} a + b + c = 4 \\ 9a + 3b + c = -2 \\ 4a - 2b + c = 17 \end{cases}$

C. $\begin{cases} 2a + b + c = 4 \\ 6a + 3b + c = -2 \\ -4a - 2b + c = 17 \end{cases}$

D. $\begin{cases} x^2 + 4x + c = y \\ 3x^2 - 2x + c = y \\ -2x^2 + 17x + c = y \end{cases}$

13.) What are the solutions to the quadratic equation, $y^2 + 2y = 9 + 5y$?

A. $y = \dfrac{3 \pm 3i\sqrt{3}}{2}$

B. $y = \dfrac{-3 \pm 3\sqrt{5}}{2}$

C. $y = \dfrac{3 \pm 3i\sqrt{5}}{2}$

D. $y = \dfrac{3 \pm 3\sqrt{5}}{2}$

Algebra 2 Unit 5 Practice Test **Name:**_____

#1-16: Find the solutions, or zeroes or roots, to each function or equation by using the best method (square rooting, factoring, or the quadratic formula). Simplify all answers using *i* if needed.

1.) $\frac{1}{2}x^2 + 5 = 41$

2.) $x^2 + 6x - 27 = 0$

3.) $x^2 + 5x - 99 = 3x$

4.) $-4x^2 + 18x - 4 = 10x$

5.) $2(x-6)^2 - 45 = 53$

6.) $f(x) = 2x^2 - 4x - 1$

7.) $-4x^2 + 25 = 0$

8.) $-3(x+4)^2 - 18 = 6$

9.) $y = 2x^3 - 9x^2 + 4x$

10.) $3x^2 + 5x - 3 = 4x - 8$

11.) $-3x^2 + 50 = 2$

12.) $x^4 - 50x^2 + 54 = 5$

13.) $16x^2 - 14x = 0$

14.) $3x^2 + 4x + 12 = 15$

15.) $x^2 + 8x + 6 = 3x$

16.) $-2x^3 + 16x = 0$

17.) The graph of $h(x) = -x^2 + 10x - 16$ models the height, in feet, of one of the arches at the entrance of a parking structure. What is the width of the parking structure at the base?

18.) Which of following functions does NOT represent the parabola with a vertex at $(1, 4)$ and x-intercepts $(-1, 0)$ and $(3, 0)$.

A. $f(x) = -x^2 + x + 4$

C. $f(x) = -x^2 + 2x + 3$

B. $f(x) = -(x-1)^2 + 4$

D. $f(x) = -(x+1)(x-3)$

19.) Compare the axis of symmetry and the minimum values for the two functions below.

$h(x) = 2(x+3)(x-7)$ $\quad\quad$ $j(x) = x^2 - 4x - 21$

Determine which of the following statements is correct.

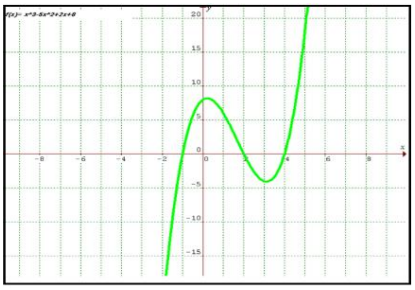
A. The functions $h(x)$ and $j(x)$ have the same axis of symmetry, but the minimum value of $h(x)$is less than the minimum value of $j(x)$.

B. The functions $h(x)$ and $j(x)$ have the same axis of symmetry, but the minimum value of $h(x)$is greater than the minimum value of $j(x)$.

C. The functions $h(x)$ and $j(x)$ do not have the same axis of symmetry, and the minimum value of $h(x)$is less than the minimum value of $j(x)$.

D. The functions $h(x)$ and $j(x)$ do not have the same axis of symmetry, and the minimum value of $h(x)$is greater than the minimum value of $j(x)$.

20) Write a possible equation for the function graphed below:



Find the solutions for $f(x) = 0$ in the following functions:

21.) $f(x) = -13x^4 + 39x^3$

22.) $f(x) = 4x^2 - 4x - 3$

For 23-25, find the zeroes.

23.) $-x^{13} + 49x^{11} = 0$

24.) $x^2 - 50 = 14$

25.) $2x^3 - 50x = 0$

Solve each system algebraically:

26.) $\begin{cases} f(x) = 2x^2 + 8x - 7 \\ g(x) = -4x - 7 \end{cases}$

27.) $\begin{cases} f(x) = 2x^2 - 6x + 7 \\ g(x) = 5x - 5 \end{cases}$

28.) $\begin{cases} x^2 + 8x + 10y + 7 = 19 \\ 3x + 5y = 2 \end{cases}$

29) Which of the following systems of equations could a student use to write a quadratic function in standard form for the parabola passing through the points (-3, -4), (6, 5) and (-1, 12)?

A. $\begin{cases} 9a - 3b + c = -4 \\ 36a + 6b + c = 5 \\ a - b + c = 12 \end{cases}$

C. $\begin{cases} 9a - 4b + c = y \\ 36a + 5b + c = y \\ a + 12b + c = y \end{cases}$

B. $\begin{cases} -6a - 3b + c = -4 \\ 12a + 6b + c = 5 \\ -2a - b + c = 12 \end{cases}$

D. $\begin{cases} -3x^2 - 4x + c = y \\ 6x^2 + 5x + c = y \\ -x^2 + 12b + c = y \end{cases}$