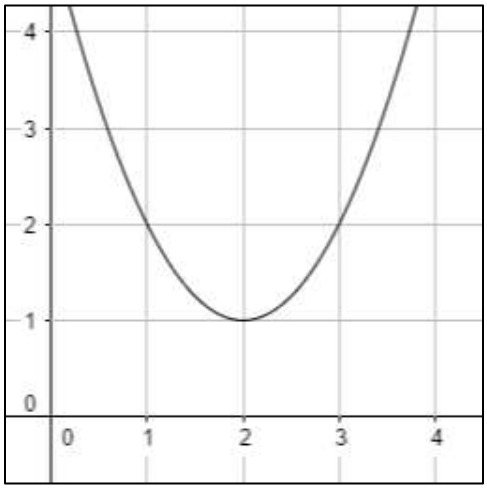
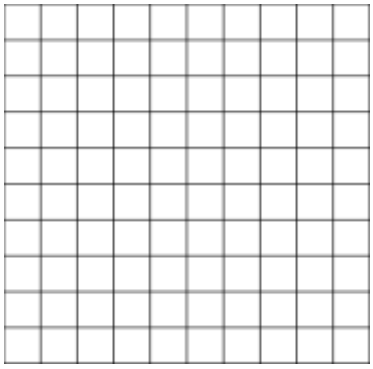
Name: _____ Period: _____ Date: _____

Unit 9 – Quadratic Functions & Their Properties Review Guide

1. **Identify the vertex of the graph. Also, tell whether the vertex is a minimum or a maximum.**



2. **Graph the quadratic function $y = -1.5x^2$.**



3. **Identify the domain and range of the function $y = x^2 - 3$.**

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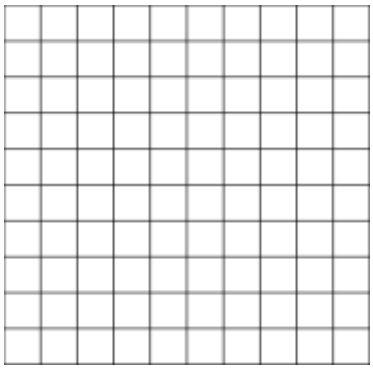
4. The line that divides the parabola into parts that are mirror images of each other is known as an:

a. Axis of symmetry
b. Vertex
c. Minimum
d. Maximum

5. Identify the axis of symmetry and vertex of the graph of the quadratic function $f(x) = x^2 - 8x$.

6. Graph the function using the vertex and axis of symmetry.

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



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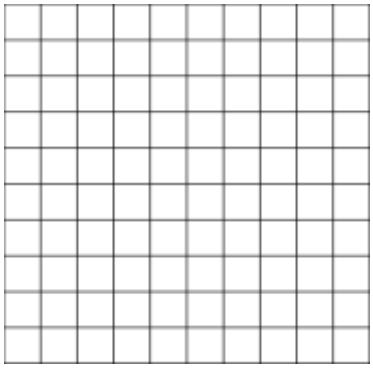
7. The point where the graph of the quadratic function intersects with axis of symmetry is known as:

a. Center
b. Vertex
c. Minimum
d. Maximum

8. Find the solution of the equation $x^2 + 2 = 0$ by graphing the related function or mention if the equation has no solution.



9. Find the solution of the equation $4b^2 - 36 = 0$ by finding the square roots or mention if the equation has no solution.

10. If the graph of the quadratic function does not intersect the x-axis, the equation has:

a. 1 solution
b. 0 solution
c. 2 solutions
d. None of these

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11. Solve the equation $y(3y + 12) = 0$

12. Solve the equation $x^2 + 11x + 28 = 0$ by factoring.

13. The solution of $x^2 - 9x - 36 = 0$ is:

a. $x = 4, -9$
b. $x = 4, 9$
c. $x = 3, -9$
d. $x = -12, 3$

14. Find the value of c which will make the expression a perfect-square trinomial.

$x^2 + 18x + c$

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15. Solve the equation by completing the square.

$z^2 - 18z = 63$

16. To complete the square in $x^2 - \frac{1}{2}x$ we will add:

a. $\frac{1}{4}$
b. $\frac{1}{16}$
c. $\frac{1}{8}$
d. 8

17. Evaluate the discriminant of the equation and tell how many solutions the equation has and are the solutions real or imaginary.

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

18. The quadratic equation has real solutions if:

a. $b^2 - 4ac < 0$
b. $b^2 - 4ac = 0$
c. $b^2 - 4ac > 0$
d. None of these

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19. Solve the quadratic equation using the quadratic formula.

$x^2 + 9x - 13 = 0$

20. Graph the set of points and determine which model best represents the data set.

(-1,-1), (-2,-2), (-3,-3), (-4,-4)

21. The graph of the equation $y = e^x$ is a/an:

a. **Straight line**
b. **U-shaped curve**
c. **Increasing curve**
d. **None of these**

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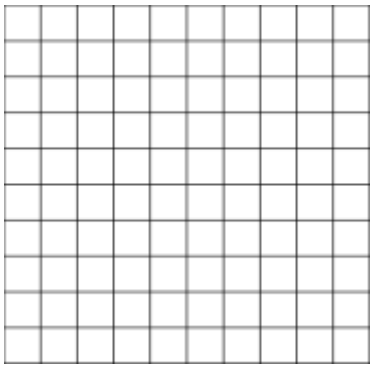
22. Which model best describes the data in each table given below?

x	y
-2	12
-1	6
0	3
1	1.5
2	0.75

23. Solve the system of equations by graphing.

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



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24. Solve the system of equation algebraically.

$$y = x^2 - 3x - 27 \quad ; \quad y = x - 6$$

25. If the graphs of linear and quadratic function do not intersect each other, then the system of equation has:

a. 2 solutions
b. 1 solution
c. 0 solutions
d. None of these

Name: _____ Period: _____ Date: _____

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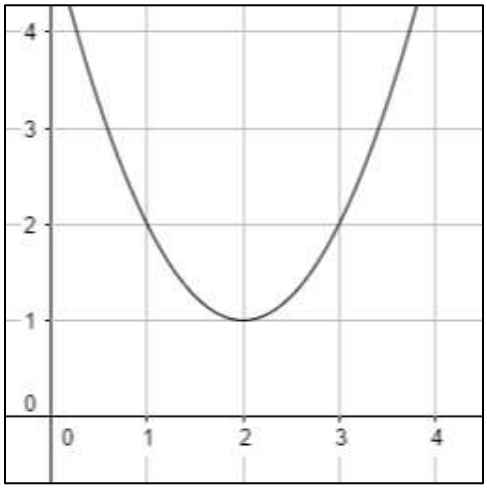
ANSWERS:

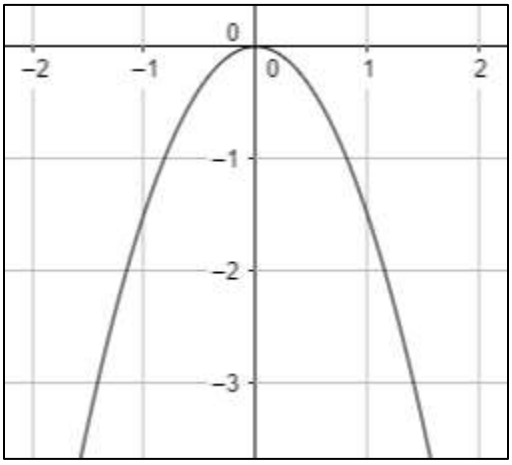
1. **Identify the vertex of the graph. Also tell whether the vertex is a minimum or a maximum.**



Vertex = (2,1)

Parabola opens up, vertex is a minimum.

2. **Graph the quadratic function $y = -1.5x^2$.**



3. **Identify the domain and range of the function $y = x^2 - 3$.**

Domain: set of all real numbers

Range: $y \geq -3$

Unit 9 – Quadratic Functions & Their Properties Review Guide

4. The line that divides the parabola into parts that are mirror images of each other is known as an:

a. Axis of symmetry
b. Vertex
c. Minimum
d. Maximum

5. Identify the axis of symmetry and vertex of the graph of the quadratic function $f(x) = x^2 - 8x$.

Axis of symmetry:

$$x = -\frac{b}{2a} \rightarrow -\frac{-8}{2(1)} = 4$$

Vertex:

$$f(4) = 4^2 - 8(4) = 16 - 32 = -16 = (4, -16)$$

6. Graph the function using the vertex and axis of symmetry.

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

Axis of symmetry:

$$x = -\frac{b}{2a} \rightarrow -\frac{4}{2(1)} = -2$$

Vertex:

$$f(-2) = (-2)^2 + 4(-2) - 2 = -6 = (-2, -6)$$

Graph:

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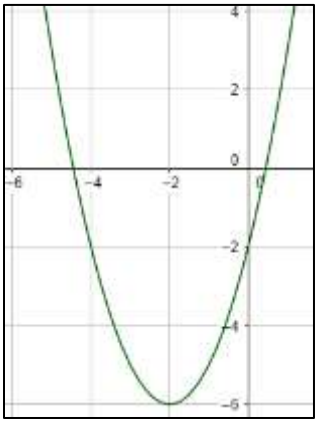
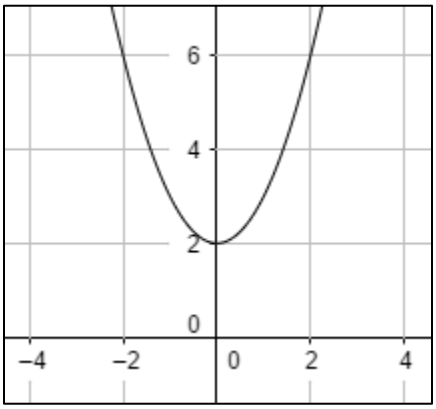


7. The point where the graph of the quadratic function intersects with axis of symmetry is known as:

a. Center
b. Vertex
c. Minimum
d. Maximum

8. Find the solution of the equation $x^2 + 2 = 0$ by graphing the related function or mention if the equation has no solution.



Solutions: No solution

9. Find the solution of the equation $4b^2 - 36 = 0$ by finding the square roots or mention if the equation has no solution.

$$b^2 = \frac{36}{4} = 9$$

$$\sqrt{b^2} = \sqrt{9}$$

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$b = \pm 3$

10. If the graph of the quadratic function does not intersect the x-axis, the equation has:

a. 1 solution
b. 0 solution
c. 2 solutions
d. None of these

11. Solve the equation $y(3y + 12) = 0$

By zero-product property:

$y = 0$ or $3y + 12 = 0$

$y = 0$; $3y = -12$

$y = 0$; $y = -4$

12. Solve the equation $x^2 + 11x + 28 = 0$ by factoring.

Factorize:

$x^2 + 7x + 4x + 28 = 0$

$x(x + 7) + 4(x + 7) = 0$

$(x + 4)(x + 7) = 0$

$x = -4$; $x = -7$

13. The solution of $x^2 - 9x - 36 = 0$ is:

a. $x = 4, -9$
b. $x = 4, 9$
c. $x = 3, -9$
d. $x = -12, 3$

14. Find the value of c which will make the expression a perfect-square trinomial.

$x^2 + 18x + c$

Here the coefficient of linear term is 18.

$c = \left(\frac{18}{2}\right)^2 = 9^2 = 81$

So, the trinomial is $x^2 + 18x + 81$

15. Solve the equation by completing the square.

$z^2 - 18z = 63$

Here the term to add is $\left(\frac{-18}{2}\right)^2 = (-9)^2 = 81$

$z^2 - 18z + 81 = 63 + 81$

$(z - 9)^2 = 144$

$z - 9 = \pm 12$

$z - 9 = 12 \quad ; \quad z - 9 = -12$

$z = 21 \quad ; \quad z = -3$

16. To complete the square in $x^2 - \frac{1}{2}x$ we will add:

a. $\frac{1}{4}$
b. $\frac{1}{16}$
c. $\frac{1}{8}$
d. 8

17. Evaluate the discriminant of the equation and tell how many solutions the equation has and are the solutions real or imaginary.

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

discriminant: $b^2 - 4ac = (-4)^2 - 4(4)(1) = 16 - 16 = 0$

Number of solutions: 1 since discriminant = 0

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Real or Imaginary: Real

18. The quadratic equation has real solutions if:

a. $b^2 - 4ac < 0$
b. $b^2 - 4ac = 0$
c. $b^2 - 4ac > 0$
d. None of these

19. Solve the quadratic equation using the quadratic formula.

$x^2 + 9x - 13 = 0$

Here $a = 1, b = 9, c = -13$

$$x = \frac{-(9) \pm \sqrt{(9)^2 - 4(1)(-13)}}{2(1)}$$

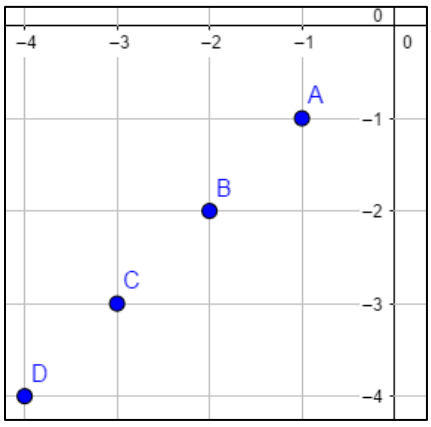
$$x = \frac{-9 \pm \sqrt{81 + 52}}{2(1)}$$

$$x = \frac{-9 \pm \sqrt{133}}{2}$$

$$x = \frac{-9 + \sqrt{133}}{2} \; ; \; x = \frac{-9 - \sqrt{133}}{2}$$

20. Graph the set of points and determine which model best represents the data set.

(-1,-1), (-2,-2), (-3,-3), (-4,-4)



The graph represents a linear model since the points make a straight line.

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21. The graph of the equation $y = e^x$ is a/an:

a. **Straight line**
b. **U-shaped curve**
c. **Increasing curve**
d. **None of these**

22. Which model best describes the data in each table given below?

x	y
-2	12
-1	6
0	3
1	1.5
2	0.75

The ratio of consecutive y-values is: $\frac{12}{6} = \frac{6}{3} = 2$

So the table represents an exponential model

23. Solve the system of equations by graphing.

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

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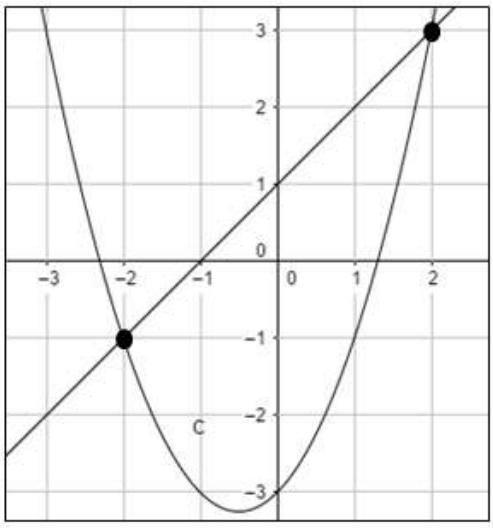

The points where two graphs intersect are (-2,-1) and (2,3).

24. Solve the system of equation algebraically.

$y = x^2 - 3x - 27$; $y = x - 6$

First put the value of y from linear equation into the quadratic equation.

$x - 6 = x^2 - 3x - 27 \rightarrow x^2 - 3x - 27 - x + 6 = 0$

$\rightarrow x^2 - 4x - 21 = 0$

$\rightarrow x^2 - 7x + 3x - 21 = 0$

$\rightarrow (x - 7)(x + 3) = 0$

$\rightarrow x = 7,\ x = -3$

$y = 7 - 6 = 1$; $y = -3 - 6 = -9$

Solutions: $(7, 1),\ (-3, -9)$

25. If the graphs of linear and quadratic function do not intersect each other, then the system of equation has:

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a. 2 solutions
b. 1 solution
c. 0 solutions
d. None of these