

Quadratics Review

Name Key pd _____ Date _____

Fill in the blank with the correct vocabulary term or terms.

- The line passing through the vertex that divides the parabola into 2 symmetric parts is called the axis of symmetry.
- If $|a| < 1$, the parabola is wider than $y = x^2$.
- If $|a| > 1$, the parabola is skinnier than $y = x^2$.
- The formula to find the axis of symmetry or x coordinate of the vertex is $x = \frac{-b}{2a}$.
- The vertex form of a quadratic equation is $y = a(x-h)^2 + k$.
- A quadratic function can be written in the standard form $y = ax^2 + bx + c$ where $a \neq 0$.
- Every quadratic function has a U-shaped graph called a parabola.
- If the leading coefficient a is positive, the parabola opens concave upward.
- If the leading coefficient a is negative, the parabola opens concave downward.
- The vertex is the lowest point of a parabola that opens up and the highest point of the parabola that opens down.

Answer Bank

$x = \frac{b}{2a}$	<u>wider</u>	<u>Concave downward</u>	<u>Parabola</u>
<u>$y = a(x-h)^2 + k$</u>	<u>Quadratic</u>	<u>Skinnier</u>	<u>$x = \frac{-b}{2a}$</u>
<u>Concave upward</u>	<u>Axis of symmetry</u>	<u>$y = a(x+h)^2 - k$</u>	<u>minimum</u>

Identify each as linear, quadratic or neither.

11. $y = 2x^2 + 3x - 1$ quadratic

12. $y = 2x + 5$ linear

13. $x = 3$ linear

14. $x^2 + y^2 = 9$ neither

15. $y = \frac{2}{3}x^2 - 12$ quadratic

16. $y = (x - 1)^2$ quadratic

Fill in the missing information.

<p>17. $y = -6x^2 + 3x - 12$</p> <p>What is the direction of opening? <u>down</u> Is the vertex a max or min? <u>max</u> Wider, narrower or same as $y = x^2$ <u>narrower</u></p>	<p>18. $y = \frac{1}{4}x^2 - 8x - 2$</p> <p>What is the direction of opening? <u>up</u> Is the vertex a max or min? <u>min</u> Wider, narrower or same as $y = x^2$ <u>wider</u></p>
<p>19. $y = \frac{5}{4}x^2 + 3x + 7$</p> <p>What is the direction of opening? <u>up</u> Is the vertex a max or min? <u>min</u> Wider, narrower or same as $y = x^2$ <u>skinnier</u></p>	<p>20. $y = 9 - x^2$</p> <p>What is the direction of opening? <u>down</u> Is the vertex a max or min? <u>max</u> Wider, narrower or same as $y = x^2$ <u>same</u></p>

Find the vertex and axis of symmetry for the quadratic functions. Write the equation in vertex form.

<p>21. $y = 2x^2 - 16x + 33$</p> <p>$a = \underline{2}$ $b = \underline{-16}$ $c = \underline{33}$</p> <p>Axis of Symmetry $x = \frac{16}{2(2)} = \underline{4}$</p> <p>$y = 2(4)^2 - 16(4) + 33$</p> <p>Vertex $y = \underline{32 - 64 + 33}$ $y = \underline{1}$ $(4, 1)$</p> <p>Vertex form $y = \underline{2(x - 4)^2 + 1}$</p>	<p>22. $y = -x^2 + 2x + 1$</p> <p>$a = \underline{-1}$ $b = \underline{2}$ $c = \underline{1}$</p> <p>$x = \frac{-2}{2(-1)} = \underline{1}$</p> <p>Axis of Symmetry $x = \underline{1}$</p> <p>$y = -(1)^2 + 2(1) + 1$</p> <p>$y = -1 + 2 + 1 = \underline{2}$</p> <p>Vertex $(\underline{1}, \underline{2})$</p> <p>Vertex form: $y = \underline{-(x - 1)^2 + 2}$</p>
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23. $y = 3x^2 - 10$

$a = 3$ $b = 0$ $c = -10$

$x = \frac{-0}{2(3)} = 0$

Axis of Symmetry $x = 0$

$y = 3(0)^2 - 10 = -10$

Vertex $(0, -10)$

Vertex form: $y = 3(x)^2 - 10$

24. $y = -8x + 13 + x^2$

$a = 1$ $b = -8$ $c = 13$

$x = \frac{8}{2(1)} = 4$

Axis of Symmetry $x = 4$

$y = -8(4) + 13 + (4)^2$

$y = -32 + 13 + 16$

Vertex $y = -3$ $(4, -3)$

Vertex Form: $y = (x - 4)^2 - 3$

Write the following in standard form and find the y-intercept.

Vertex Form	Standard Form	Y-intercept
<p>25. $y = 6(x - 4)^2 - 10$</p> <p>$y = 6(x^2 - 8x + 16) - 10$</p> <p>$y = 6x^2 - 48x + 96 - 10$</p> <p>$y = 6x^2 - 48x + 86$</p>	<p>$y = 6x^2 - 48x + 86$</p> <p>$y = 6(0)^2 - 48(0) + 86$</p>	<p>$y = 86$</p> <p>$(0, 86)$</p>
<p>26. $y = (x - 3)^2 + 2$</p> <p>$y = x^2 - 6x + 9 + 2$</p> <p>$y = x^2 - 6x + 11$</p>	<p>$y = x^2 - 6x + 11$</p> <p>$y = 0^2 - 6(0) + 11$</p>	<p>$y = 11$</p> <p>$(0, 11)$</p>
<p>27. $y = -3(x - 1)^2 + 2$</p> <p>$y = -3(x^2 - 2x + 1) + 2$</p> <p>$y = -3x^2 + 6x - 3 + 2$</p> <p>$y = -3x^2 + 6x - 1$</p>	<p>$y = -3x^2 + 6x - 1$</p> <p>$y = -3(0)^2 + 6(0) - 1$</p>	<p>$y = -1$</p> <p>$(0, -1)$</p>

Identify the vertex and the y-intercept of the following graph and then match it to the appropriate equation

	<p>29.</p>	
<p>28.</p> <p>Axis of symmetry = $x = 3$</p> <p>Vertex: $(3, -2)$</p> <p>y-intercept: $(0, 2.5)$</p> <p>Matches to Equation <u>B</u></p>	<p>Axis of symmetry = $x = 1$</p> <p>Vertex: $(1, 4)$</p> <p>y-intercept: $(0, 3)$</p> <p>Matches to Equation <u>I</u></p>	<p>30.</p> <p>Axis of symmetry = $x = 1$</p> <p>Vertex: $(1, 1)$</p> <p>y-intercept: $(0, 0)$</p> <p>Matches to Equation <u>A</u></p>
<p>31.</p> <p>Axis of symmetry = $x = 0$</p> <p>Vertex: $(0, 0)$</p> <p>y-intercept: $(0, 0)$</p> <p>Matches to Equation <u>E</u></p>	<p>32.</p> <p>Axis of symmetry = $x = 1$</p> <p>Vertex: $(1, -3)$</p> <p>y-intercept: $(0, 3)$</p> <p>Matches to Equation <u>F</u></p>	<p>33.</p> <p>Axis of symmetry = $x = -2$</p> <p>Vertex: $(-2, 3)$</p> <p>y-intercept: $(0, 1)$</p> <p>Matches to Equation <u>G</u></p>

Match the above graphs to the following equations

<p>A. $y = -x^2 + 2x$ $x = 1$ $y = 1$</p>	<p>B. $y = \frac{1}{2}(x-3)^2 - 2$</p>	<p>C. $y = 6x^2 + 12x - 3$ $x = -1$ $y = -9$</p>
<p>D. $y = x^2 + 2x$ $x = -1$ $y = -1$</p>	<p>E. $y = x^2$</p>	<p>F. $y = 6x^2 - 12x + 3$ $x = 1$ $y = -3$</p>
<p>G. $y = \frac{1}{2}(x+2)^2 + 3$</p>	<p>H. $y = \frac{1}{2}(x+3)^2 - 2$ $(-3, -2)$</p>	<p>I. $y = -x^2 + 2x + 3$ $x = 1$ $y = 4$</p>