

Graphing Quadratic Functions In Standard Form

Fill in the blank:

1. The graph of a quadratic function is called a(n) _____.
2. The _____ divides the parabola into mirror images and passes through the _____.
3. The lowest or highest point on a parabola is always at the _____.

For each function:

- a) Sketch the graph.
- b) State the vertex.
- c) State the axis of symmetry.
- d) Tell whether the function has a maximum or minimum value. State this value.
- e) State the domain and range in *SET* notation.

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

5. $y = 3x^2$

6. $y = \frac{3}{2}x^2 - 3x + 6$

Sketch the graphs of $y = 2x^2$, $y = x^2$, $y = 0.25x^2$ and $y = -x^2$ on the same coordinate plane.

7. Which graph is the widest?
8. Make a conjecture about what causes the graph of a parabola to be wider or narrower than the parent function.

WITHOUT graphing, consider the function $y = 4x^2 - 24x + 11$.

9. Determine whether the function has a minimum or maximum point. How do you know?
10. State the maximum or minimum value of the function.
11. State the domain and range of the function in *INTERVAL* notation.

The table below represents some points on the graph of a quadratic function.

x	y
-4	-43
-2	-11
1	7
3	-1
a	-11
6	-43
7	-65

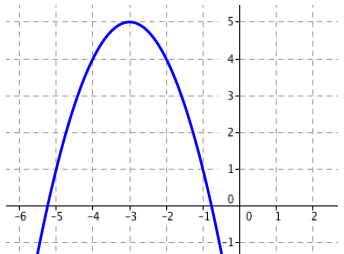
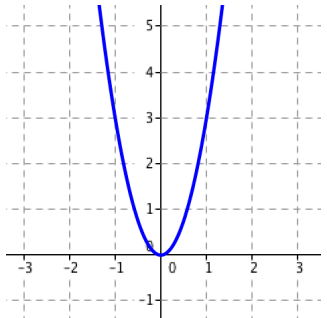
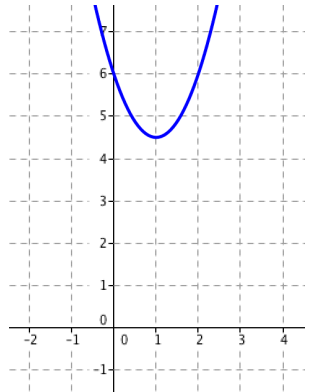
12. What are the coordinates of the vertex?
13. Determine the value of **a**.
14. Does the function have a maximum or minimum value? How do you know?

15. What is the effect on the graph of the function $y = x^2 + 2$ when it is changed to $y = x^2 - 3$?

a) The graph widens	b) The graph narrows
c) The graph opens down	d) The vertex moves down

16. The points (10, 7) and (-2, 7) lie on the graph of a parabola. Explain how you can use these two points to find the axis of symmetry. Then state the axis of symmetry.

ANSWERS

1. parabola	2. axis of symmetry; vertex	3. vertex
<p>4. a)</p>  <p>b) $(-3, 5)$ c) $x = -3$ d) Maximum, 5 e) Domain: $\{x x \in R\}$ Range: $\{y y \leq 5\}$</p>	<p>5. a)</p>  <p>b) $(0, 0)$ c) $x = 0$ d) Minimum, 0 e) Domain: $\{x x \in R\}$ Range: $\{y y \geq 0\}$</p>	<p>6. a)</p>  <p>b) $(1, 9/2)$ c) $x = 1$ d) Minimum, $9/2$ e) Domain: $\{x x \in R\}$ Range: $\left\{y \mid y \geq \frac{9}{2}\right\}$</p>
7. $y = 0.25x^2$		8. For a quadratics $y = ax^2 + bx + c$ when $a > 1$ the graph is narrower than the parent function and when $a < 1$ the graph is wider than the parent function.
9. The function has a minimum point since $a=4 > 0$	10. Minimum, -25	11. Domain: $(-\infty, \infty)$ Range: $[-25, \infty)$
12. $(1, 7)$	13. $a=4$	14. The function has a maximum value since the vertex has a y-value of 7 and all of the other y-values are smaller.
15. d		16. $x = 4$, Since both points have the same y-value, the x-value of the axis of symmetry must lie in the middle of the given x-values.