

Algebra II

7-6

Quadratic Functions

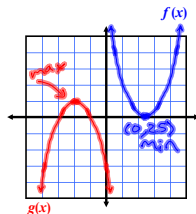
General Form of a Quadratic Function - $y = ax^2 + bx + c$
 Good for: Solving; x and y intercepts

Standard Form of a Quadratic Function - $y = a(x-h)^2 + k$
 Good for Vertex: (h, k)

Knowing the vertex also helps find the maximum, minimum, and the range.

Which of the two quadratic functions has a maximum value? $g(x)$ at $(-2, 8)$

Which has a minimum? $f(x)$ at $(0, 2.5)$



Where does the max or min always occur? **Vertex**

Graph each function. (pg 336)

7) $h(x) = x^2 + 2x - 3$

y -int: $(0, -3)$

To find y -ints, set $x = 0$

x -int: $\{-3, 1\}$

$0 = x^2 + 2x - 3$

$0 = (x+3)(x-1)$

To find x -ints, set $y = 0$

$h(x) = (x^2 + 2x + 1) - 3 - 1$

$b = 2, \frac{1}{2}(2) = 1, (1)^2 = 1$

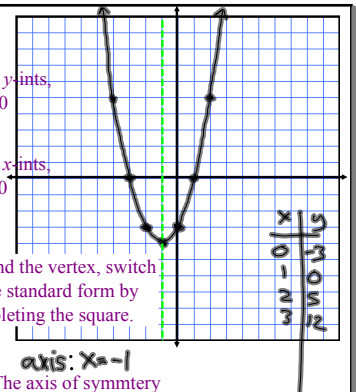
To find the vertex, switch to the standard form by completing the square.

$h(x) = (x+1)^2 - 4$

vertex: $(-1, -4)$

axis: $x = -1$

The axis of symmetry is always $x = h$.



Find the maximum value or the minimum value of each function. Then give the coordinates of the vertex of the graph. **Find vertex**

19) $g(x) = 2x^2 + 8x$

$g(x) = (2x^2 + 8x) + 0$

$g(x) = 2(x^2 + 4x + 4) + 0 - 8$

$g(x) = 2(x+2)^2 - 8$

vertex: $(-2, -8)$

min or max

min value of -8

For each function, find (a) the vertex of its graph, (b) its domain, (c) its range, (d) its zeros.

25) $f(x) = x^2 - 4x - 3$

a) vertex: $(2, -7)$

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

$f(x) = (x-2)^2 - 7$

min at $x=2$

value of -7

b) \mathbb{R}

c) range: $[-7, \infty)$

$a=1$ $b=-4$ $c=-3$

d) zeros

$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-3)}}{2(1)}$

$= \frac{4 \pm \sqrt{16 + 12}}{2} = \frac{4 \pm \sqrt{28}}{2} = \frac{4 \pm 2\sqrt{7}}{2}$

$\{2 \pm \sqrt{7}\}$

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2-36 even
(skip 10)] 8 graphs