5-2 Determining the vertex of a quadratic

Vertex (turning pt) ← Vertex

I. Two ways Quadratics are written:

Vertex form

$f(x) = a(x-h)^2 + k$

vertex: (h, k)

ex/ $f(x) = 4(x-\overset{-h}{2})^2 + \overset{+k}{7}$

vertex: $(2, 7)$

standard form

① find x $\left(x = \frac{-b}{2a}\right)$

② Plug it into find y

$f(x) = -3x^2 - 12x + 4$

$x = \frac{-b}{2a} = \frac{+(+12)}{2(-3)} = \frac{12}{-6} = -2$

$f(x) = -3x^2 - 12x + 4$

$f(-2) = -3(-2)^2 - 12(-2) + 4$

$= -3(4) + 24 + 4$

$= -12 + 24 + 4$

$= 16$

vertex: $-2, 16$

II. Other stuff the vertex tells you...

axis of symmetry

$x =$ (x of vertex)

Maximum or Minimum

$y =$ (y of vertex)

\+ Minimum

\- Maximum

"It can't get worse than" — is the best I got."

ex/ Vertex is $(4, -7)$

axis of symmetry: $x = 4$

Max or Min: $y = -7$

ex| $f(x) = -5(x+7)^2 - 3$

vertex form: $a(x-h)^2+k$

Vertex: $(-7, -3)$

axis of symm: $x = -7$ max or min in $y = -3$

ex| $f(x) = x^2+4x+0$

Standard: ax^2+bx+c

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

$f(-2) = (-2)^2 + 4(-2) = 4 - 8 = -4$

vertex $(-2, 4)$

axis of symm: $x = -2$

max or (min)

$y = -4$