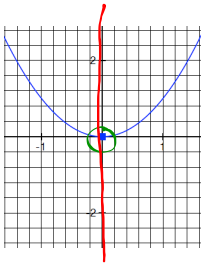
8-1 Vertex Form

A quadratic equation, when graphed forms a parabola. Every parabola has a vertex and an axis of symmetry.



Identify the vertex and axis of symmetry:

V: (0,0) A: X=0

Make a hypothesis of where the axis of symmetry will always be:

I can see the vertex of a quadratic when the quadratic is in graphing, or vertex form: $f(x)=a(x-h)^2+k$

The vertex is the point (h,k)

Remember X'S ALWAYS LIE

The axis of symmetry will always be the line $x=h$.

A quadratic equation has two most common forms:

Standard Form: $f(x)=ax^2+bx+c$

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

We call this vertex form because you can see the vertex which is (h,k). REMEMBER THAT X's ALWAYS lie

To change a quadratic from standard form to vertex form we must complete the square. This then allows us to see the vertex.

Change the following quadratic into vertex form and identify the vertex and axis of symmetry

$f(x)=x^2+6x-1$

$\frac{6}{2}=3$, $3^2=9$

$9+1=x^2+6x+9$

$10=(x+3)^2$

$-10 \quad -10$

$f(x)=(x+3)^2-10$

V: (-3,-10)

A: x=-3

$f(x)=x^2+6x-1$

$f(x)=x^2+6x+9-1-9$

$f(x)=(x+3)^2-10$

V: (-3,-10)

A: x=-3

Change the following into vertex form and identify the vertex and axis of symmetry:

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

$\frac{4}{2} = 2^2 = 4$

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

$f(x) = (x+2)^2 - 1$

V: $(-2, -1)$ A: $x = -2$

Change the following into vertex form and identify the vertex and axis of symmetry:

$f(x) = 7x^2 - 14x - 56$

$\frac{-2}{2} = (-1)^2 = 1$

$f(x) = 7x^2 - 14x + \_\_ - 56 - \_\_$

$f(x) = 7(x^2 - 2x + 1) - 56 - 7$

$f(x) = 7(x-1)^2 - 63$

V: $(1, -63)$ A: $x = 1$

Change the following into vertex form and identify the vertex and axis of symmetry:

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

$\frac{-2}{2} = (-1)^2 = 1$

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

$f(x) = 2(x^2 - 2x + 1) + 2 - 2$

$f(x) = 2(x-1)^2$

V: $(1, 0)$ A: $x = 1$

Change the following into vertex form and identify the vertex and axis of symmetry:

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

$\frac{-2}{2} = -1$

$f(x) = -2x^2 + 4x + \_\_ + 1 - \_\_$

$f(x) = -2(x^2 - 2x + 1) + 1 + 2$

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

A: $x = 1$

V: $(1, 3)$

Change the following into vertex form and identify the vertex and axis of symmetry:

$f(x) = 6x^2 + 24x - 18$

$\frac{4}{2}$ 2

$f(x) = 6x^2 + 24x + \_\_ - 18 - \_\_$

$f(x) = 6(x^2 + 4x + 4) - 18 - 24$

$f(x) = 6(x+2)^2 - 42$

V: $(-2, -42)$

~~A: $x = -2$~~