

Identifying the 6 key features of a Quadratic Function

Goal: SWBAT Identify the 6 key features

1. Vertex:

The Highest or Lowest Point on the parabola.



$x = \frac{-b}{2a}$, the substitute x into $f(x)$ to find y

2. Axis of Symmetry:

Imaginary line that runs through the vertex.



Always the x -value of the vertex $x =$ []

3. Minimum or Maximum:

maximum: the highest point



minimum: the lowest point



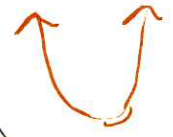
4. Facing:

The direction the parabola open.

If a -value is:

Positive = up

negative = down



5. y intercept:

Where the parabola hits the y -axis always the c -value $(0, c)$

6. Zeros: The solutions (aka x -intercepts) of Quadratics

- 1.) Factor it
- 2.) Square root
- 3.) Quadratic formula
- 4.) Graph it (look at the x -axis)

Example: Identify the 6 key features of $f(x) = -x^2 - 8x - 15$

1. Vertex:

$$a = -1 \quad x = \frac{-b}{2a}$$

$$b = -8$$

$$c = -15 \quad x = \frac{8}{-2} = \boxed{-4}$$

$$-(-4)^2 - 8(-4) - 15$$

$$-16 + 32 - 15 = \boxed{1}$$

$$(-4, 1)$$

2. Axis of Symmetry:

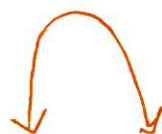
$$x = -4$$

3. Minimum or Maximum:

maximum

4. Facing:

Downward



6. Zeros:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(-1)(-15)}}{2(-1)}$$

$$x = \frac{8 \pm \sqrt{64 - 60}}{-2} = \frac{8 \pm \sqrt{4}}{-2}$$

$$x = \frac{8 \pm 2}{-2} \Rightarrow \frac{8+2}{-2} = \frac{10}{-2} = \boxed{-5}$$

$$\frac{8-2}{-2} = \frac{6}{-2} = \boxed{-3}$$