

Algebra I: Unit 07 review: Key features of a parabola

Consider the parabola given by the equation:

$$y = (2x + 6)(x - 7)$$

1. Will this parabola open up or open down? UP

Explain how you know:

BECAUSE THE SLOPES OF THE
LINEAR FACTORS ARE BOTH
POSITIVE.

2. Find the x-intercepts of the parabola:

SUBSTITUTE $y=0$:

$$0 = (2x+6)(x-7)$$

$$2x+6=0$$
$$\begin{array}{r} -6 \quad -6 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{-6}{2}$$

$$x = -3$$

OR

$$x-7=0$$

$$+7 \quad +7$$

$$x = 7$$

OR

3. Find the y-intercept of the parabola:

SUBSTITUTE $x=0$:

$$y = (2(0)+6)(0-7)$$
$$= (6)(-7) = \boxed{42}$$

4. Find the coordinates of the vertex of the parabola. Show all of your work

X-COORD: HALFWAY BETWEEN
X-INTS:

$$x = \frac{-3+7}{2} = \frac{4}{2} = \boxed{2}$$

Y-COORD: SUBSTITUTE X-COORD:

$$y = (2(2)+6)(2-7)$$
$$= (4+6)(-5)$$
$$= \boxed{-50}$$

$$\Rightarrow \boxed{(2, -50)}$$

Consider the parabola given by the equation:

$$y = -4x^2 - 32x + 36$$

5. Will this parabola open up or open down? DOWN

Explain how you know:

THE LEADING COEFFICIENT (-4) IS
NEGATIVE

6. Find the x -intercepts of the parabola:

SUBSTITUTE $y=0$: $0 = -4x^2 - 32x + 36$

$$0 = -4(x^2 + 8x - 9)$$

	x	$+9$
x	x^2	$+9x$
-1	$-1x$	-9

$$x + 9 = 0$$

$$x = -9$$

$$x - 1 = 0$$

$$x = 1$$

7. Find the y -intercept of the parabola:

SUBSTITUTE $x=0$:

$$y = -4(0)^2 - 32(0) + 36$$

$$y = 36$$

8. Find the coordinates of the vertex of the parabola. Show all of your work

x -COORD.: HALFWAY BETWEEN
 x -INTERCEPTS.

$$x = \frac{-9 + 1}{2} = \frac{-8}{2} = -4$$

y -COORD.: SUBSTITUTE x -COORD:

$$y = -4(-4)^2 - 32(-4) + 36$$

$$= -4(16) + 128 + 36$$

$$= -64 + 128 + 36$$

$$= 100$$

$$\Rightarrow (-4, 100)$$