

Quadratics 3d: Graphing Quadratics
by Factoring

Standards: A-REI.4b, A-SSE.3a, F-IF.8a

Math Practices: Make sense of problems and persevere in solving them.

GLOs: #3 - Complex Thinker

HW#12

Learning Target:

- How do you use factoring to graph a quadratic equation?

Recall: One of the main reasons we wish to solve quadratic equations is so that we can find the zeros, and hence the x-intercepts, which then tell us the vertex. So, let's use our results from some of the previous problems to graph some parabolas. Remember, you've done the hard part already, factoring and solving for the zeros.

Factored Form

$$f(x) = a(x-s)(x-t)$$

Standard Form

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

1a) Graph $f(x) = x^2 - 6x - 16$,

(from 2f)

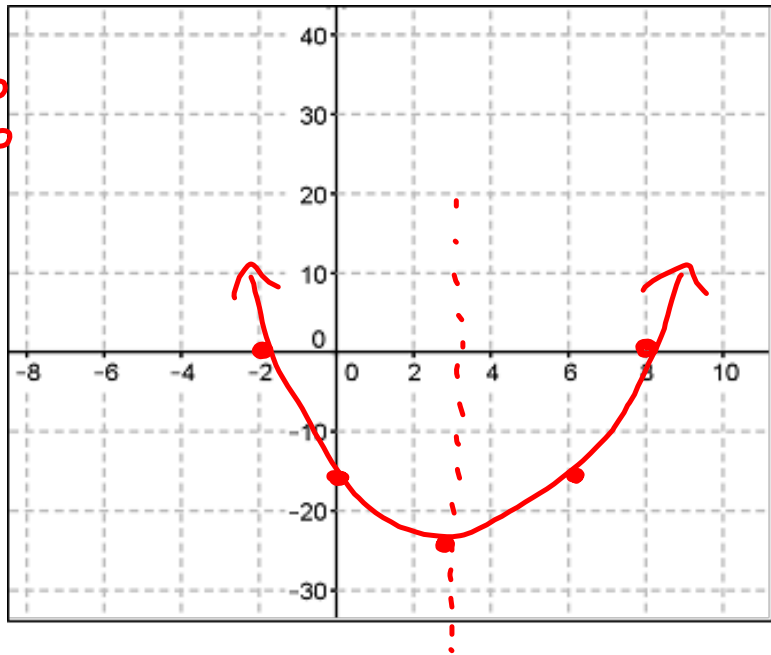
Be sure to show both coordinates of the vertex and intercepts.

① Factor. $a=1$
 $x^2 - 6x - 16$ $b=-6$
 $c=-16$
 • no GCF

$a \cdot c = -16$ $b = -6$

$\begin{array}{r} 1 \quad -16 \\ 2 \quad -8 \\ 4 \quad -4 \end{array}$

$\begin{array}{c} x-8 \\ x^2-8x \\ +2 \quad +2x-16 \end{array}$



$$f(x) = (x+2)(x-8)$$

y-int: (set $x=0$ & solve)
 $f(0) = (0+2)(0-8)$
 $= (2)(-8)$

$$f(0) = -16$$

$$(0, -16)$$

x-int: (set $y=0$ & solve)

$$0 = (x+2)(x-8)$$

$$x+2=0 \quad x-8=0$$

$$x=-2 \quad x=8$$

$$(-2, 0) \quad (8, 0)$$

vertex:

$$x: \frac{-2+8}{2} = \frac{6}{2} = 3$$

$$y: f(3) = (3+2)(3-8)$$

$$= (5)(-5)$$

$$f(3) = -25$$

$$(3, -25)$$

1b) Graph $f(x) = x^2 - 7x$

(from 2c)

Be sure to show both coordinates of the vertex and intercepts.

① Factor.

$$x^2 - 7x$$

$$\text{GCF} = x$$

$$x(x-7)$$

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

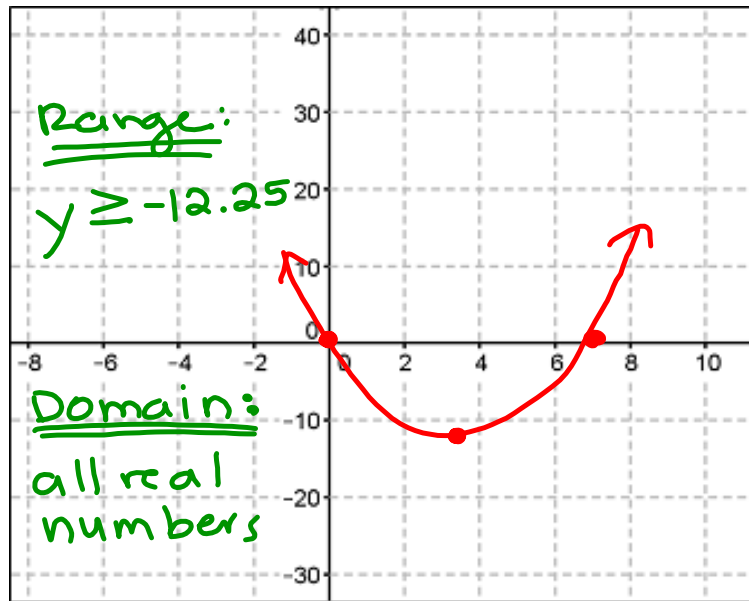
vertex:

$$x = \frac{0+7}{2} = \frac{7}{2} = 3.5$$

$$y = f(3.5) = 3.5(3.5-7) \\ = 3.5(-3.5)$$

$$f(3.5) = -12.25$$

$$(3.5, -12.25)$$



y-int:

$$f(0) = 0(0-7) \\ = 0(-7)$$

$$f(0) = 0$$

$$(0, 0)$$

x-int:

$$0 = x(x-7)$$

$$x=0 \quad x-7=0 \\ \quad \quad \quad +7 \quad +7 \\ \quad \quad \quad x=7$$

$$(0, 0) \text{ \& } (7, 0)$$