

Learning Goal: By the end of today, we will be able to recognize properties of a quadratic from its given form (factored or standard), and use those properties to graph the quadratic.

Mar 27-12:41 PM

Unit 2 Quadratics

Recall: $y=mx+b$ ← equation of a line
Linear Relations $y=b$ ← horizontal line
 $x=a$ ← vertical line

The equation of a line can be written in several different forms.

$$y = 2x + 4 \quad (\text{Slope/intercept form})$$

$$2x + 3y - 7 = 0 \quad (\text{Standard form})$$

$$3x + 7y = 11 \quad (\text{Intercept form})$$

Different forms of the equation of a line, tell us different pieces of information.

Oct 16-11:04 AM

Quadratic Highlights:

The maximum/minimum value always occurs at the vertex.

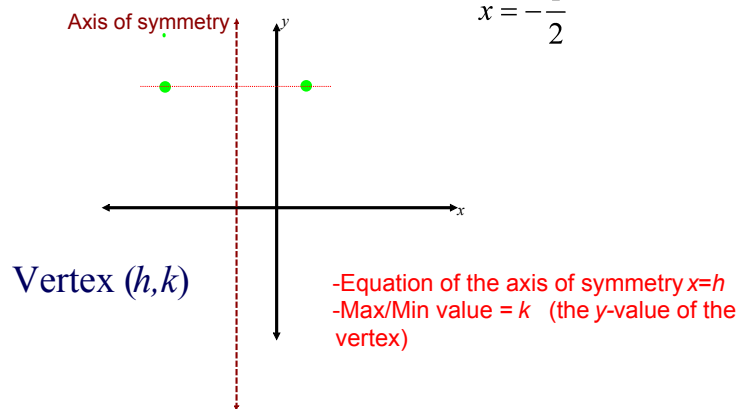
The vertex is the only point on the axis of symmetry.

The x-value of the vertex is always the average of any 2 x-values that have the same y-value.

Illustration: $(x,y) \gg (2,7)$
 $(-3,7)$

$$x = \frac{2 + -3}{2}$$

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



Mar 21-10:28 AM

Another important part of a quadratic are the zeros.

The zeros are the x-intercepts, or where the curve crosses the x axis.

The y-intercept is just the same as for a linear, but it is not the b in the equation - it is the c

$$y = ax^2 + bx + c \quad \text{- standard form of a quadratic}$$

ie.

$$y = x^2 + 6x + 9 \quad \text{has a y-intercept of } (0,9)$$

Mar 21-11:43 AM

Summary - Quadratics

A quadratic relation can be recognized by the following:

- (i) equation - the largest exponent will be a "two"
- (ii) the graph will be in the shape of a parabola
- (iii) the table of values will have a SECOND difference that is constant

Standard Form $y = ax^2 + bx + c$ where "c" is the y intercept (0,c)

Factored Form $y = a(x - s)(x - t)$ where "s" and "t" are the Zeroes
and

"a" for both will control if the parabola is "happy" (opens upward) or "sad" (open downward).

Apr 2-11:23 AM

We can Expand a Factored Form to create the Standard Form.

ie $y = (x+1)(x-2)$ expands to $y = x^2 - 1x - 2$

We can Factor a Standard Form to create the Factored Form.

ie $y = x^2 + 1x - 6$ factors to $y = (x+3)(x-2)$

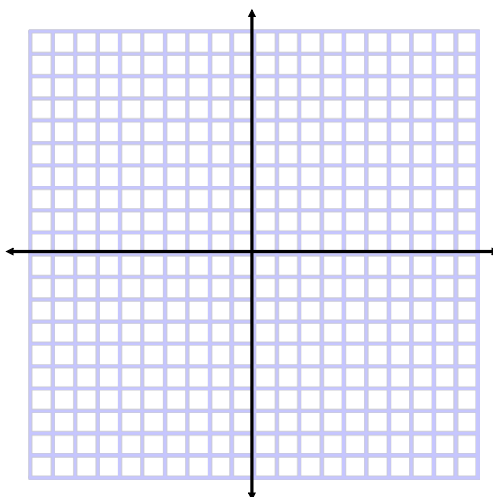
Oct 8-3:35 PM

Find the following for the given quadratic function:

- (i) x intercepts (zeros)
- (ii) y intercept
- (iii) axis of symmetry
- (iv) vertex
- (v) opens upward or downward

$$y = (x + 3)(x - 1)$$

Use the information to graph the quadratic.



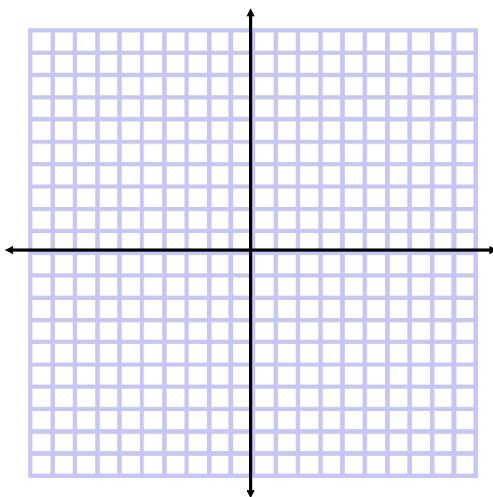
Oct 8-3:35 PM

Find the following for the given quadratic function:

- (i) x intercepts (zeros)
- (ii) y intercept
- (iii) axis of symmetry
- (iv) vertex
- (v) opens upward or downward

$$y = 2x^2 - 8x - 10$$

Use the information to graph the quadratic.



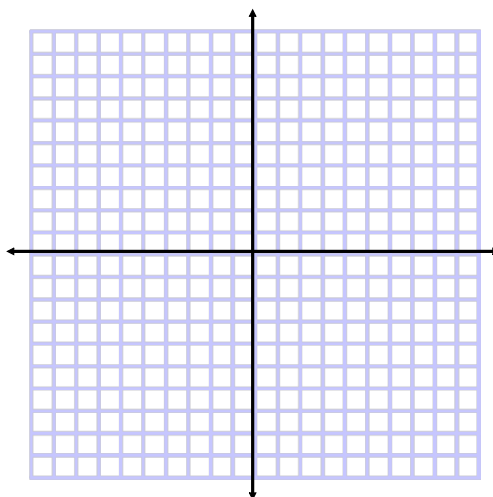
Oct 8-3:35 PM

Find the following for the given quadratic function:

- (i) x intercepts (zeros)
- (ii) y intercept
- (iii) axis of symmetry
- (iv) vertex
- (v) opens upward or downward

$$y = -3x^2 + 12$$

Use the information to graph the quadratic.



Oct 8-3:35 PM

Consolidation Questions:

Page 139 #2ac, 3ac, 4bg, 6, 10

Oct 8-3:23 PM