Monday, February 25, 2019

- Warm-up
  - Write the following equations in standard form: $y = ax^2 + bx + c$
    - $y = (x - 3)(x + 4)$
    - $y = 2(x + 5)^2 + 6$
    - $y - 3 = \frac{1}{2}(x - 7)^2$
- More with parabolas

Objectives

Content: I will find and identify critical values of a parabola including y-intercept, x-intercept, vertex, focus and directrix.

Social: I will help those around me to understand by explaining my reasoning clearly.

Language: I will use the vocabulary for the critical values of a parabola including y-intercept, x-intercept, vertex, focus and directrix correctly in speaking.

What can I get from equations?

Factored Form

$y = (x - 3)(x + 4)$

x-intercepts

$x - 3 = 0$ $\quad x + 4 = 0$

$x = 3$ $\quad x = -4$

$x^2 + 4x - 3x - 12$

$y = x^2 + x - 12$

Vertex Form

$y = 2(x + 5)^2 + 6$

vertex

focus & directrix

$(-5, 6)$

$2(x+5)(x+5) + 6$

$2(x^2 + 5x + 5x + 25) + 6$

$2(x^2 + 10x + 25) + 6$

$2x^2 + 20x + 50 + 6$

$y = 2x^2 + 20x + 56$

Standard form = conic

$y - 3 = \frac{1}{2}(x - 7)^2$

Vertex → $(7, 3)$

focus & directrix

$y - 3 = \frac{1}{2}(x-7)(x-7)$

$y - 3 = \frac{1}{2}(x^2 - 7x - 7x + 49)$

$y - 3 = \frac{1}{2}(x^2 - 14x + 49)$

$y - 3 = \frac{1}{2}x^2 - 7x + \frac{49}{2}$

$+3 \qquad\qquad +3$

$y = \frac{1}{2}x^2 - 7x + 27\frac{1}{2}$

Objectives

Content: I will find and identify critical values of a parabola including y-intercept, x-intercept, vertex, focus and directrix.

Social: I will help those around me to understand by explaining my reasoning clearly.

Language: I will use the vocabulary for the critical values of a parabola including y-intercept, x-intercept, vertex, focus and directrix correctly in speaking.

Review Focus & Directix

$y = ax^2 + bx + c$

$y = 1x^2 + x - 12$ ← y-int

$(x-3)(x+4)$

$x-3=0 \quad x+4=0$ ← x-intercepts

$x=3 \quad x=-4$

$\frac{-b}{2a}$

axis of symmetry → $\frac{3+-4}{2}$

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

$y = \left(-\frac{1}{2}\right)^2 + \frac{1}{2} - 12$

$\frac{1}{4} + \frac{1}{2} - 12$

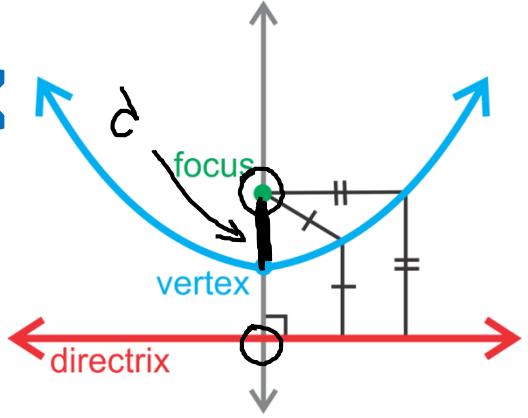
$\frac{1}{4} - \frac{2}{4} - 12 = -12\frac{1}{4}$

$\left(-\frac{1}{2}, -12\right)$

$\frac{1}{4}$

$y = -12\frac{1}{2}$

$\left(-\frac{1}{2}, -12\frac{1}{4}\right)$



Vertex form

$y = a(x-h)^2 + k$ (vertex)

$y = a\left(x - -\frac{1}{2}\right)^2 + -12\frac{1}{4}$

$a = \frac{1}{4d}$

$d \cdot 1 = \frac{1}{4d} \cdot d$

$d = \frac{1}{4}$

Objectives

Content: I will find and identify critical values of a parabola including y-intercept, x-intercept, vertex, focus and directrix.

Social: I will help those around me to understand by explaining my reasoning clearly.

Language: I will use the vocabulary for the critical values of a parabola including y-intercept, x-intercept, vertex, focus and directrix correctly in speaking.

Challenge: find the quadratic equations given the following

Focus: (4, 6) **Directrix: y = 0**	**x-intercepts: ~~(0, -3)~~ and ~~(0, 6)~~** **a = 1**
Vertex: (-2, 4) **a = -1**	**Focus: (3, -2)** **Directrix: y = 4**

Objectives

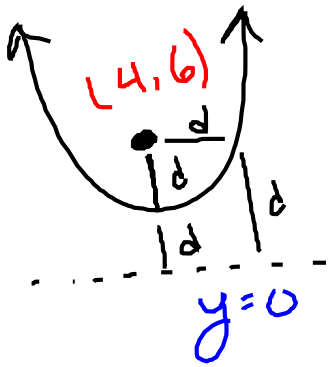
Content: I will find and identify critical values of a parabola including y-intercept, x-intercept, vertex, focus and directrix.

Social: I will help those around me to understand by explaining my reasoning clearly.

Language: I will use the vocabulary for the critical values of a parabola including y-intercept, x-intercept, vertex, focus and directrix correctly in speaking.

Focus: (4, 6)
Directrix: y = 0

distance: $\sqrt{(y_2-y_1)^2+(x_2-x_1)^2}$



Focus to parabola $=$ Directrix to parabola

$$\left(\sqrt{(6-y)^2+(4-x)^2}\right)^2=\left(\sqrt{(0-y)^2+(x-x)^2}\right)^2$$

$$(6-y)^2+(4-x)^2=(0-y)^2+(x-x)^2$$

$$(6-y)(6-y)+(4-x)(4-x)=(-y)^2+0^2$$

$$36-6y-6y+y^2+16-4y-4x+x^2=y^2$$