Thursday, March 7, 2019

- Warm-up
  - Graph the following parabola: $f(x) = \frac{2x^2}{2} + \frac{4x}{2} - \frac{6}{2}$
  - Mark the y-intercept(s), x-intercept(s), and vertex

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- Review graphing quadratics
- Forms of quadratic equations
- Introduce focus & directrix

Objectives:
Content: I will review parabolas and add new components including the **focus** and **directrix**.
Social: I will listen well and not distract others from the lesson.
Language: I will write clear notes with the definition of **focus** and **directrix** in various forms.

Warm-up

$f(x) = 2x^2 + 4x - 6$

$2(x^2 + 2x - 3)$

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

x-intercept(s): $(-3, 0)$ $(1, 0)$

$x+3=0$ $x-1=0$

$x=-3$ $x=1$

y-intercept(s): $(0, -6)$

vertex: $(-1, -8)$

axis of symmetry $x = -1$

$\frac{-3+1}{2} = \frac{-2}{2} = -1$

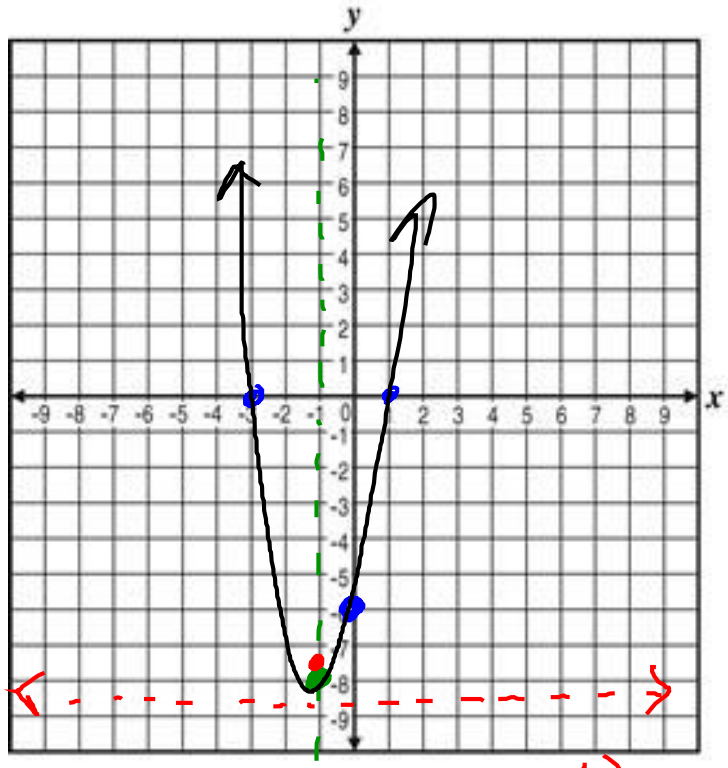
$y = 2(-1)^2 + 4(-1) - 6$

$= 2 \cdot 1 + -4 - 6$

$= 2 + -4 - 6$

$= -2 + -6$

$= -8$



Focus = $(-1, -7\frac{1}{2})$

Directrix = $y = -8\frac{1}{2}$

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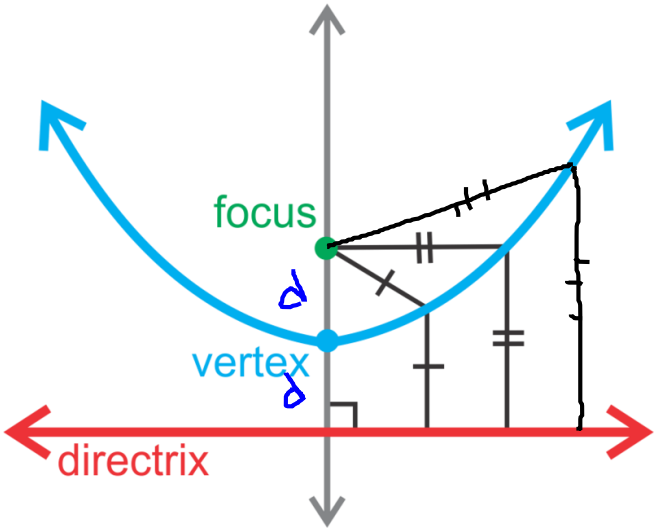
What are a focus and directrix?

- New definition of parabola: "the set of all points that are equidistant from a point and a line"
  - The focus is the point
  - The directrix is the line



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Getting the parabola...

Focus: (1, 3)

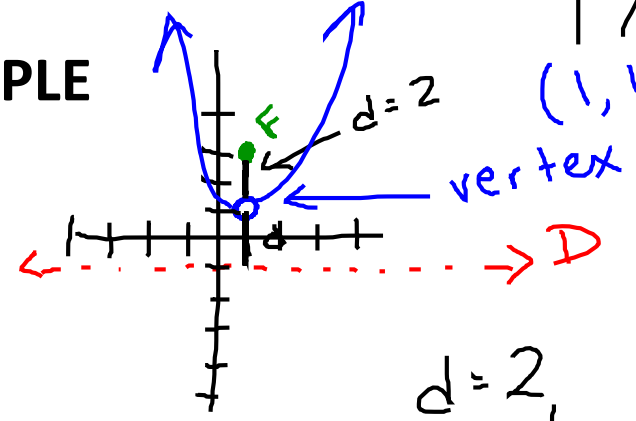
Directrix: y = -1

STEPS

1. Graph Focus & Directrix
2. Find the point in the middle, that is the vertex
3. Use distance (p) to calculate a $a = \frac{1}{4p}$
4. Put it together in vertex form

EXAMPLE

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



$d = 2$

$a = \frac{1}{4(2)} = \frac{1}{8}$

$y = \frac{1}{8}(x-1)^2 + 1$

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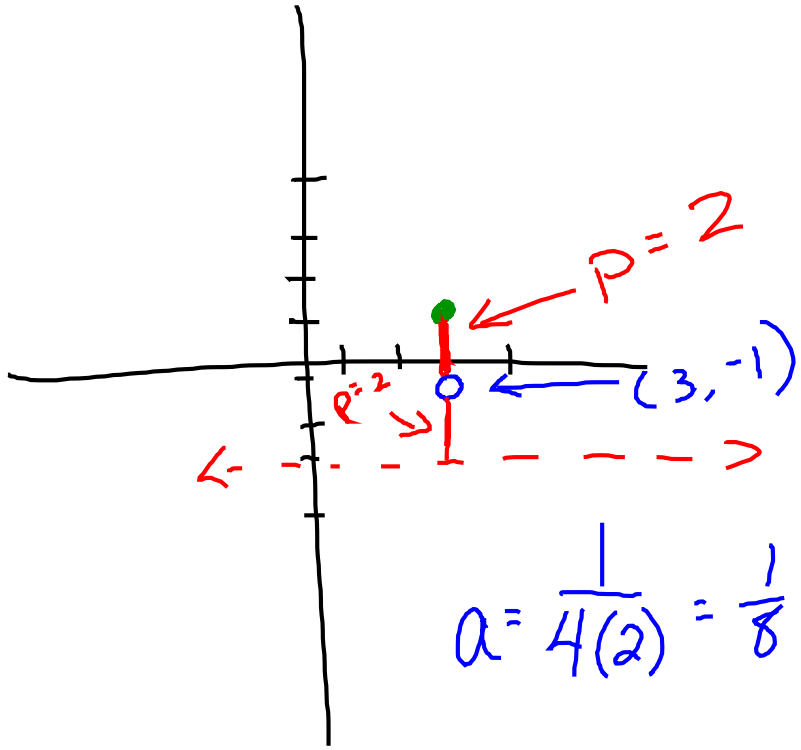
You practice

Focus: (3,1)

Directrix: y = -3

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

$y = \frac{1}{8}(x-3)^2 - 1$



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Forms...

STANDARD FORM

$y = ax^2 + bx + c$

shows y-intercept

FACTORED FORM

$y = a(x - x_1)(x - x_2)$

shows x-intercepts

VERTEX FORM

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

shows vertex (h, k)

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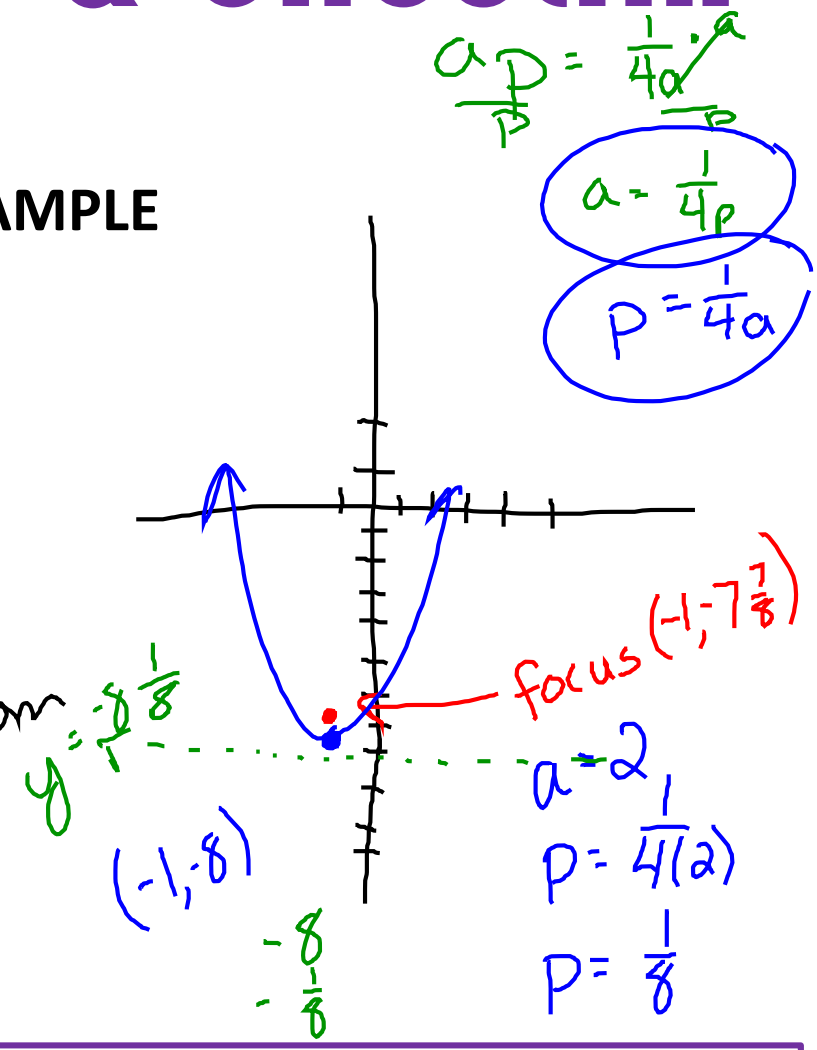
Getting the focus & directrix

$$y = \underset{a}{2}x^2 - 8x + 6$$

STEPS

1. find the vertex
2. find p $\left(p = \frac{1}{4a}\right)$
3. find focus - add p to y-value of vertex
4. find directrix - subtract p from y-value of vertex

EXAMPLE



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You practice

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

a

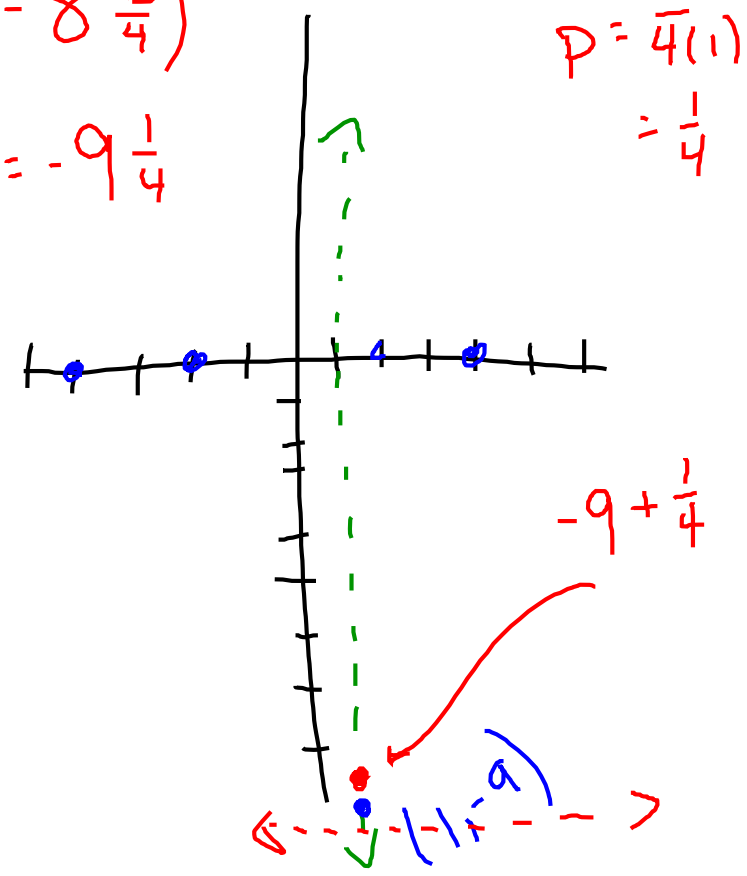
focus: $(1, -8\frac{3}{4})$

directrix: $y = -9\frac{1}{4}$

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

$p = \frac{1}{4(1)}$

$= \frac{1}{4}$



x-intercepts:

axis & sym:

vertex:

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If $x^2 - 8x = 48$ and $x < 0$, what is the value of $x + 10$?

$x^2 - 8x - 48 = 0$

( )( ) = 0

(A) −2
(B) 4
(C) 6
(D) 8

Exit Slip

- Choose an answer
- Explain your reasoning (show your process).
- Choose an incorrect answer, explain the mistake someone who chose that one made.

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