11.4 Parabolas

Warm-Up Monday (notecard)

1. Which of the following equations represent ~~hyperbolas~~? (choose all that apply)

A. $-x^2 + 10x + y - 21 = 0$

B. $x^2 - y^2 - 2x - 8 = 0$

C. $9x^2 + 4y^2 - 54x - 8y - 59 = 0$

D. $4x^2 + 4y^2 - 20x - 32y + 81 = 0$

E. $-x^2 - 3y^2 - 12x = 0$

F. $-9x^2 + y^2 - 72x - 153 = 0$

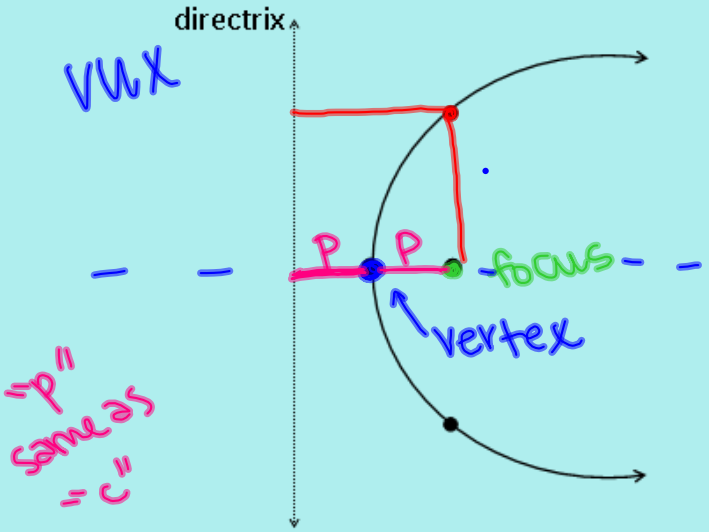
EXPLAIN WHY YOU MADE YOUR CHOICES!!

About Me

1. What matters to you more than anything?
2. What do you make fun of or complain about me behind or in front of my back? Be honest :)

Parabolas

definition: The set of points in a plane equidistant from a point F, called the focus, and a line d, called the directrix.



Vertex: (h, k) (center)

Focus: $(h \pm p, k)$

Directrix: $x = h \pm p$

Axis: $y = k$

Horizontal Axis

Axis – line through focus and vertex

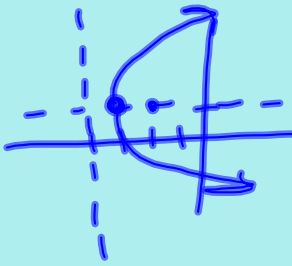
$$(y-k)^2 = 4p(x-h)$$

↑ 4p is always w/ not squared

opens left - p is NEGATIVE

opens right - p is POSITIVE

- ex. Graph $(y-1)^2 = 4(x+3)$

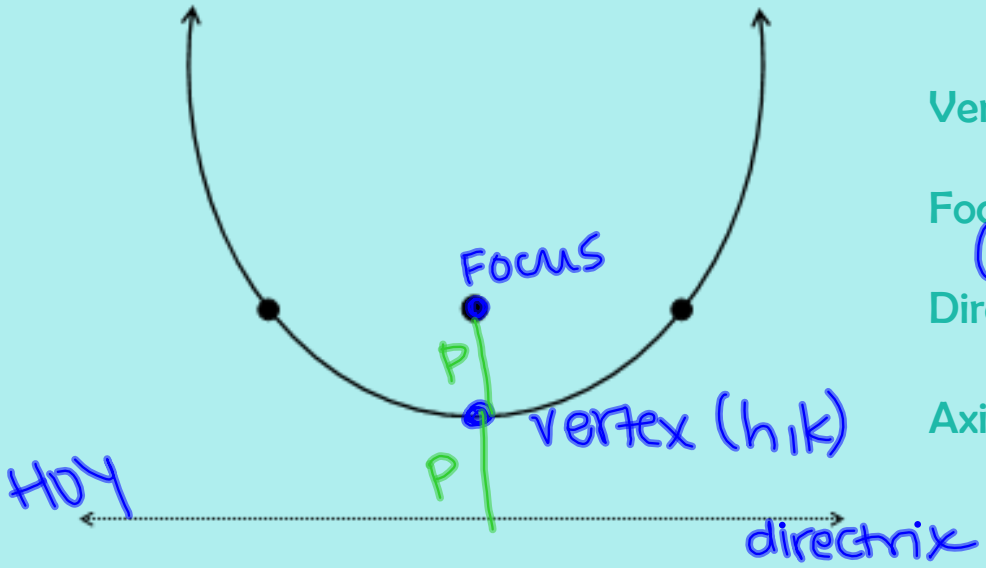


focus: (-2, 1)
directrix: $x = -4$
Axis: $y = 1$

vertex: (-3, 1)
$y^2 \rightarrow$ hz axis
$4p = 4$
$p = 1$
opens right

Parabolas

definition: The set of points in a plane equidistant from a point F, called the focus, and a line d, called the directrix.



Vertex: (h, k)

Focus $(h, k \pm p)$

Directrix: $y = k \pm p$

Axis: $x = h$

Vertical Axis

$$(x-h)^2 = 4p(y-k)$$

opens up - p is POSITIVE

opens down - p is NEGATIVE

- ex. Graph $8(y-3) = (x+3)^2$

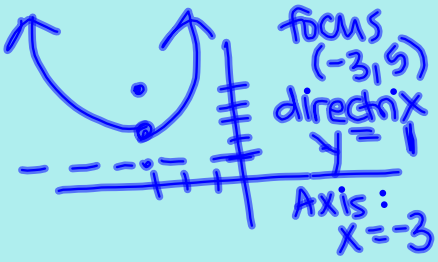
example:

vertex: $(-3, 3)$

$4p = 8$

$p = 2$

opens up



Parabola Graphing Tips:

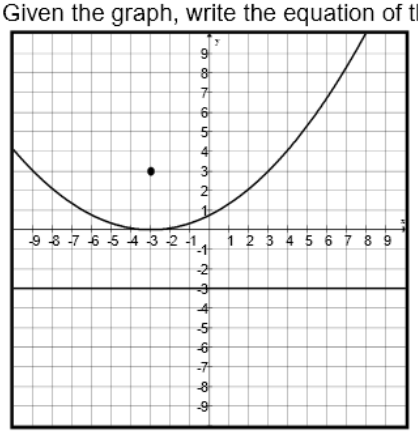
- Find the vertex.
- Find p. $4p = \#$
- Decide how the parabola opens.
- Plot the focus and directrix.
- Sketch.

#1-6 ALL

Practice – Parabolas

Name _____ Date _____ Period _____

1. Given the graph, write the equation of the parabola and find all the critical values.



Vertex: _____

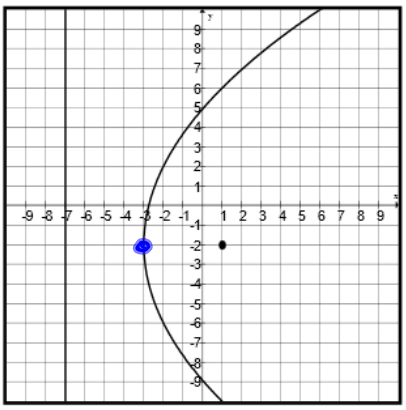
Focus: _____

Directrix: _____

Axis of symmetry: _____

Equation: _____

2. Given the graph, write the equation of the parabola and find all the critical values.



Vertex: _____

Focus: _____

Directrix: _____

Axis of Symmetry: _____

Equation: _____

Find the critical values for each parabola and then graph.

3. $(y-1)^2 = 4(x+3)$

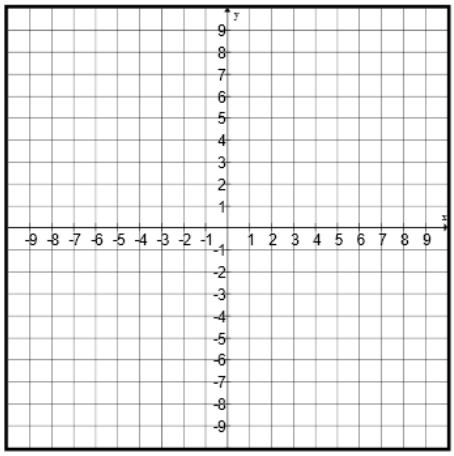
Vertex: _____

Value of *p*: _____

Focus: _____

Directrix: _____

Axis of Symmetry: _____



4. $(x-3)^2 = 4(y+6)$

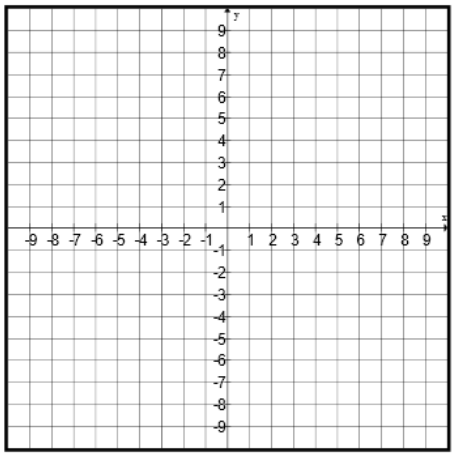
Vertex: _____

Value of *p*: _____

Focus: _____

Directrix: _____

Axis of Symmetry: _____



5. $y - \frac{1}{8}x^2 = 0$

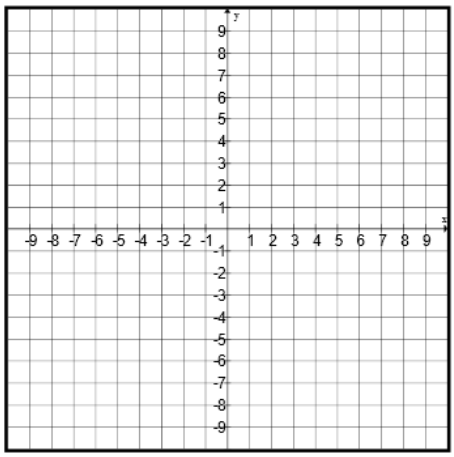
Vertex: _____

Value of *p*: _____

Focus: _____

Directrix: _____

Axis of Symmetry: _____



6. $\frac{1}{8}(y+3)^2 - 5 = x$

Vertex: _____

Value of *p*: _____

Focus: _____

Directrix: _____

Axis of Symmetry: _____