

## 6.5 Parabolas

A parabola is a locus (set) of points in a plane equidistant from a fixed point (focus) and a fixed line (directrix).

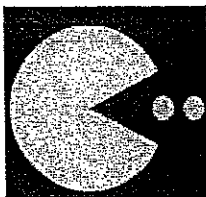
What do we already know about parabolas?

$$\text{Vertical: } (x - h)^2 = \pm 4p(y - k)$$

$$\text{Horizontal: } (y - k)^2 = \pm 4p(x - h)$$

Vertex:  $(h, k)$  Kind of like the center...think of it more as the starting point for the graph ☺

$p$  units from the vertex in both directions is the focus and directrix. The parabola opens into the focus. Think of it like



$4p$ - focal width (width through the focus)

Ex. 1

$$x^2 = 20y$$

Identify:

Function/ Not a Function  
Opens

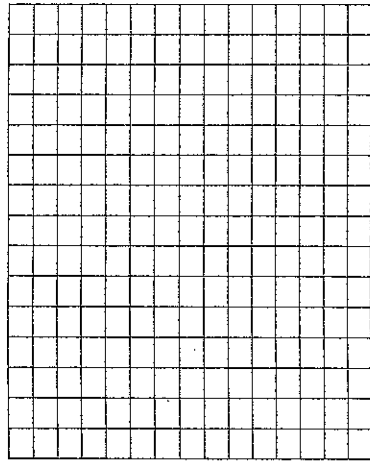
Identify:

Vertex

Focus

Focal Width

Equation of Directrix



Ex. 2.

$$y^2 = -8x$$

Identify:

Identify:

Function/ Not a Function  
Opens

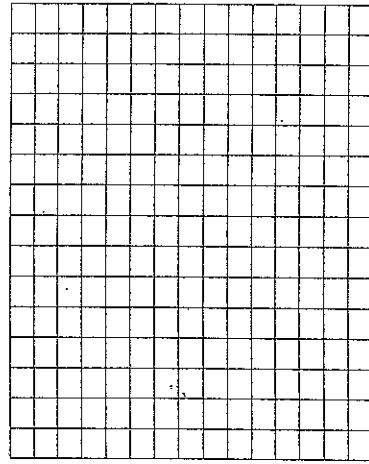
Identify:

Vertex

Focus

Focal Width

Equation of Directrix



Ex. 3.

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

Identify:

Function/ Not a Function  
Opens

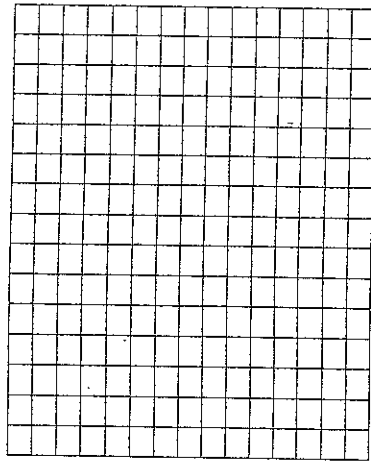
Identify:

Vertex

Focus

Focal Width

Equation of Directrix



Ex. 4.

$$(x+4)^2 = 24(y-1)$$

Identify:

Function/ Not a Function  
Opens

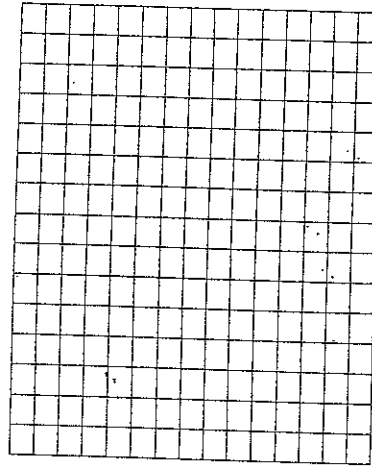
Identify:

Vertex

Focus

Focal Width

Equation of Directrix



Name: \_\_\_\_\_  
Period: \_\_\_\_\_

Date: \_\_\_\_\_  
Pre-Calculus Parabolas

Directions: Fill in the missing information and graph each parabola on a separate set of axes.

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

Function/ Not a Function \_\_\_\_\_

Opens \_\_\_\_\_

Vertex \_\_\_\_\_

Focus \_\_\_\_\_

Focal Width \_\_\_\_\_

Equation of Directrix \_\_\_\_\_

2.  $(y + 3)^2 = -8(x - 7)$

Function/ Not a Function \_\_\_\_\_

Opens \_\_\_\_\_

Vertex \_\_\_\_\_

Focus \_\_\_\_\_

Focal Width \_\_\_\_\_

Equation of Directrix \_\_\_\_\_

3.  $y^2 = 8(x + 1)$

Function/ Not a Function \_\_\_\_\_

Opens \_\_\_\_\_

Vertex \_\_\_\_\_

Focus \_\_\_\_\_

Focal Width \_\_\_\_\_

Equation of Directrix \_\_\_\_\_

4.  $x^2 = -16(y - 3)$

Function/ Not a Function \_\_\_\_\_

Opens \_\_\_\_\_

Vertex \_\_\_\_\_

Focus \_\_\_\_\_

Focal Width \_\_\_\_\_

Equation of Directrix \_\_\_\_\_

5.  $(y + 5)^2 = -12(x + 3)$

Function/ Not a Function \_\_\_\_\_

Opens \_\_\_\_\_

Vertex \_\_\_\_\_

Focus \_\_\_\_\_

Focal Width \_\_\_\_\_

Equation of Directrix \_\_\_\_\_

6.  $(x - 2)^2 = 20y$

Function/ Not a Function \_\_\_\_\_

Opens \_\_\_\_\_

Vertex \_\_\_\_\_

Focus \_\_\_\_\_

Focal Width \_\_\_\_\_

Equation of Directrix \_\_\_\_\_

## 6.5 Writing Equations of Parabolas

Write the equation for the parabola with...

1. vertex  $(3,7)$  and directrix  $y=4$
2. vertex  $(2, -1)$  and directrix  $x=3$
3. vertex  $(-4, 2)$  and focus  $(-5, 2)$
4. vertex  $(0,4)$  and focus  $(3,4)$
5. focus  $(0,2)$  and directrix  $y=8$
6. focus  $(3, -1)$  and directrix  $x=-5$