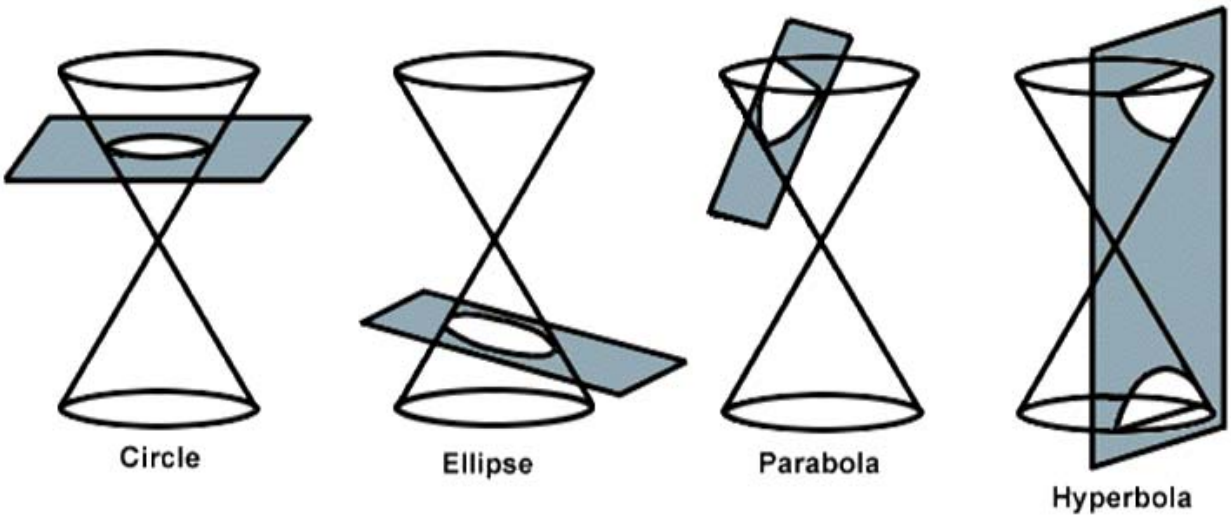
PreCalculus 12 Date _____

Unit 2: Conics

2.1 Conics Intro & Parabolas

Conic Sections – resulting curves when a double-napped right circular cone is intersected by a plane



Circle – plane parallel to the base (perpendicular to the central axis)
Ellipse – plane at an angle but not through the base (an intersection that creates a closed curve)
Parabola - plane parallel to the surface of the cone
Hyperbola – plane parallel to the central axis (perpendicular to the base

From PreCalculus 11 we are familiar with quadratics whose resulting parabola graphs are vertically opening (up or down):

$$y = a(x - p)^2 + q$$

Vertex: (p, q)
Vertical axis of symmetry (a/s): $x = p$
Domain: $\{x | x \in \mathbb{R}\}$
Range: $\{y | y \geq q, y \in \mathbb{R}\}$ **if** $a > o$ **ie. opens up**
$\{y | y \leq q, y \in \mathbb{R}\}$ **if** $a < o$ **ie. opens down**

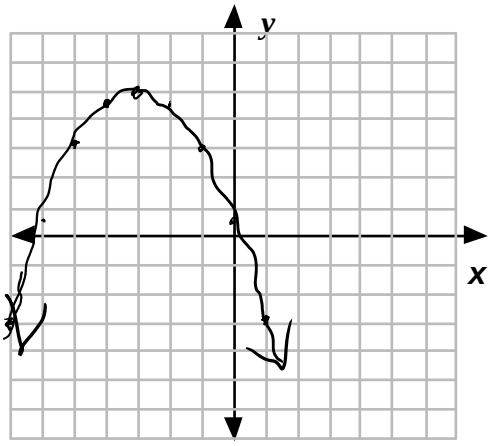
In Conics we will also have quadratics whose resulting parabola graphs are horizontally opening (right or left):

$$x = a(y - q)^2 + p$$

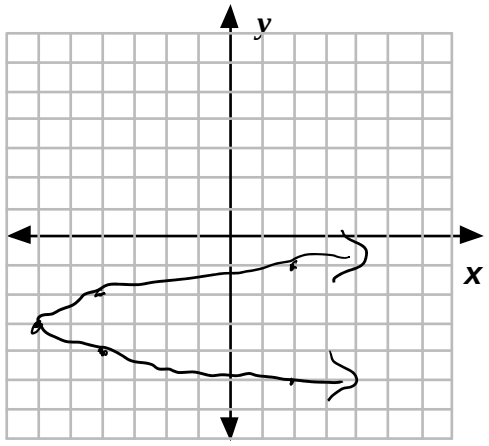
Vertex: (p, q)
Horizontal axis of symmetry (a/s): $y = q$
Domain: $\{x | x \geq p, x \in \mathbb{R}\}$ **if** $a > o$ **ie. opens right**
$\{x | x \leq p, x \in \mathbb{R}\}$ **if** $a < o$ **ie. opens left**
Range: $\{y | y \in \mathbb{R}\}$

Ex. Graph each conic on the grid provided:

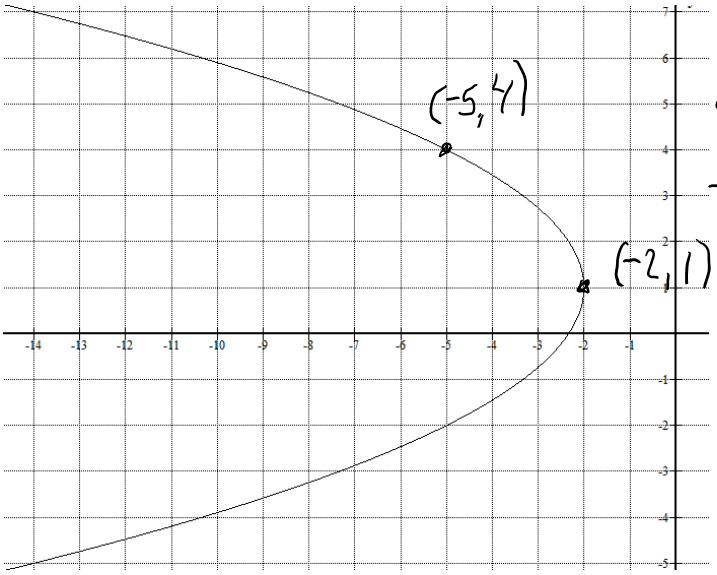
$y = -\frac{1}{2}(x+3)^2 + 5$ (-3, 5)



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



Ex. Write the equation of each conic shown:



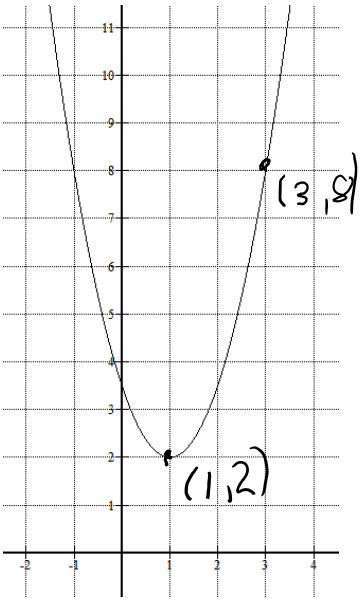
$x = a(y-1)^2 - 2$

$-5 = a(4-1)^2 - 2$

$-3 = 9a$

$-\frac{1}{3} = a$

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



$y = a(x-1)^2 + 2$

$8 = a(3-1)^2 + 2$

$6 = 4a$

$\frac{3}{2} = a$

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

Practice: worksheets