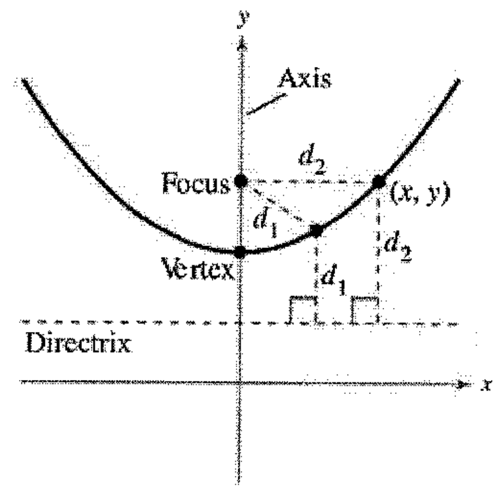
Precalculus **Name** ______________________

9.1 Notes: Parabolas

Parabola: The set of all points (x, y) in a plane that are ____________________ from a fixed line called the ____________________, and a fixed point called the ____________.

Info about Parabolas

Standard Equation	$(x-h)^2 = 4p(y-k)$	$(y-k)^2 = 4p(x-h)$
Axis of Symmetry (AOS)	$x = h$	$y = k$
Vertex	(h,k)	(h,k)
Focus	$(h,k+p)$	$(h+p,k)$
Directrix	$y = k - p$	$x = h - p$
Direction of Opening	Upward if $p > 0$ Downward if $p < 0$	Right if $p > 0$ Left if $p < 0$
Latus Rectum (LR)	$\lvert 4p \rvert$	$\lvert 4p \rvert$



- The midpoint between the **focus** and the **directrix** is the ____________________.
- The line passing through the **focus** and the **vertex** is the ____________________.
- The ____________________ and the **axis of symmetry** are always perpendicular.
- The ____________________ is a line segment perpendicular to the **axis of symmetry** that passes through the ____________ and has endpoints on the parabola.
- To *recognize* that the equation of a conic is a **parabola**, notice that there is ____________________.

Write the standard form of the equation for each parabola. Find and graph all of the requested information.

1. $y = x^2 - 12x + 30$

Opens:

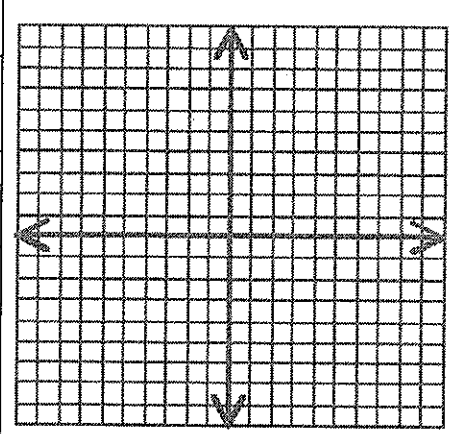
Vertex:

AOS:

Focus:

Directrix:

LR:



2. $y^2 - 4x + 2y + 5 = 0$

Opens:

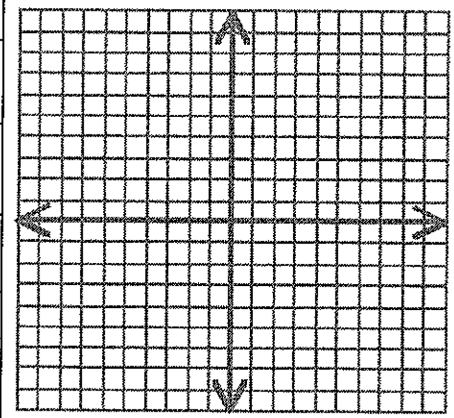
Vertex:

AOS:

Focus:

Directrix:

LR:



3. The focus is at $(2,2)$ and the equation of the directrix is $x = -2$.

Opens:

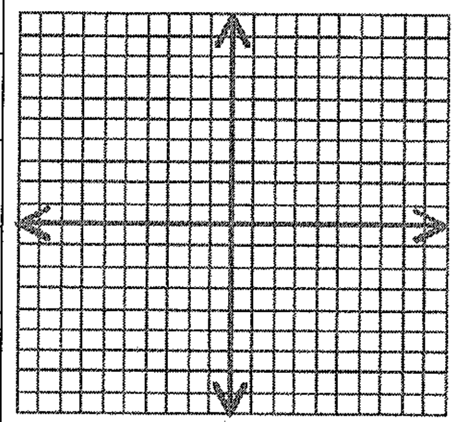
Vertex:

AOS:

Focus: $(2,2)$

Directrix: $x = -2$

LR:



4. The vertex is at $(-2,0)$ and the coordinates of the focus are $\left(-2, \frac{1}{2}\right)$.

Opens:

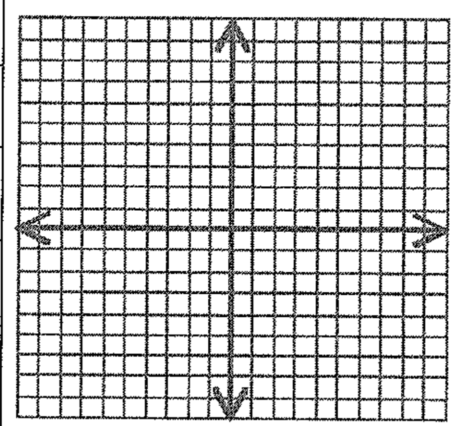
Vertex: $(-2,0)$

AOS:

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

Directrix:

LR:



Find the standard equation of the parabola; then find the coordinates of the vertex. Determine if the graph of the parabola will be a function.

5. $y^2 + 2y - x + 6 = 0$

Homework: Page 668 #s 37-42, 44, 63, 66, 70