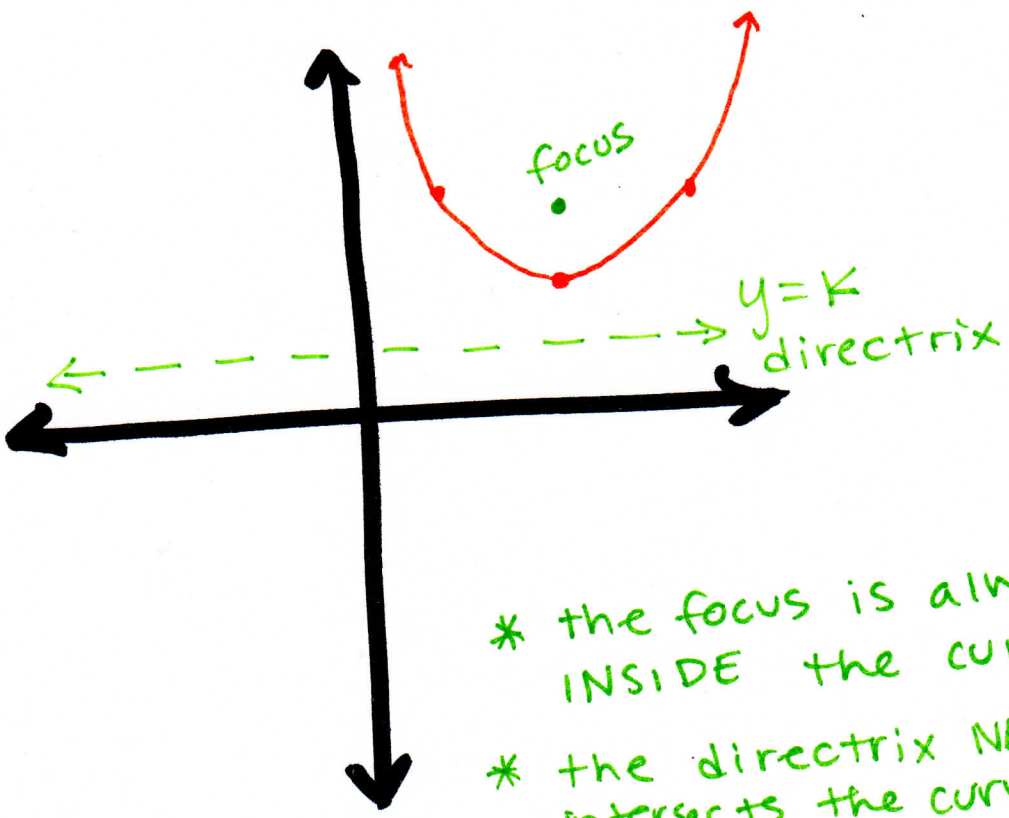
CONICS

Lesson 1 - Parabolas

set of all points that are equidistant from a fixed point (focus) and a fixed line (directrix)



* the focus is always INSIDE the curve
* the directrix NEVER intersects the curve.

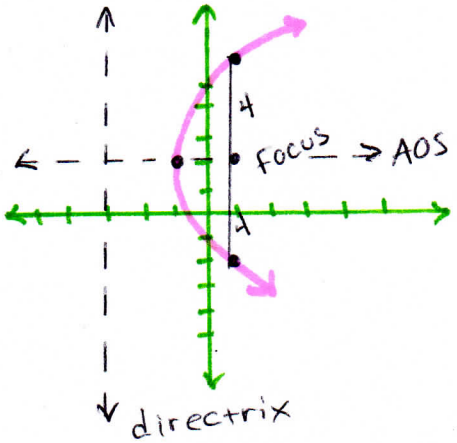
Standard Form	$(x-h)^2 = 4p(y-k)$	$(y-k)^2 = 4p(x-h)$
Vertex	(h, k)	(h, k)
Opening	UP - if $4p > 0$ DOWN - if $4p < 0$	RIGHT - if $4p > 0$ LEFT - if $4p < 0$

p the distance from the vertex to the focus. (this is also the distance from the vertex to directrix).

|4p| Focal width length of the chord through the focus and perpendicular to the axis of symmetry (AOS).

Ex.1] Give the critical info and graph $(y-2)^2 = 8(x+1)$

vertex: $(-1, 2)$
opens: right
AOS: $y = 2$
Focal width (4p): 8
p: 2
Focus: $(1, 2)$
Directrix: $x = -3$



Ex.2] Give the critical info and graph $(x-2)^2 = -4(y+1)$

vertex: $(2, -1)$

opens: down

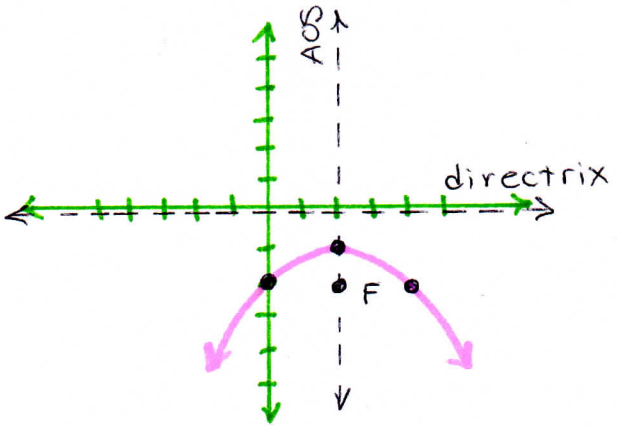
AOS: $x = 2$

Focal width: 4

p: 1

directrix: $y = 0$

focus: $(2, -2)$



For ALL CONICS General Form:

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$$

- Parabola : $A = 0$ or $C = 0$

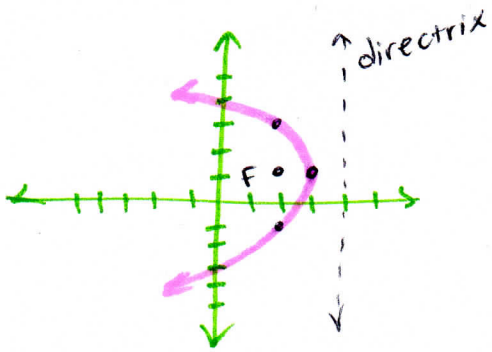
Ex. 3] $y^2 - 2y + 4x - 11 = 0$

$y^2 - 2y = -4x + 11$

$y^2 - 2y + \underline{1} = -4x + 11 + \underline{1}$

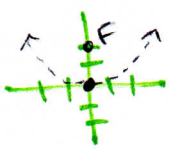
$(y-1)^2 = -4(x-3)$

vertex: $(3, 1)$
opens: left
AOS: $y = 1$
focal width: 4



P: 1
D: $x = 4$
f: $(2, 1)$

Ex. 4] Given vertex $(0,0)$ and focus $(0,2)$ find the equation



$(x-0)^2 = 8(y-0)$

$x^2 = 8y$

P: 2
4P: 8