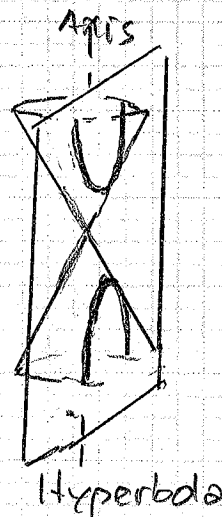
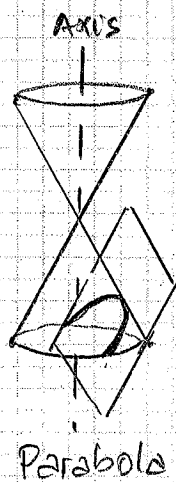
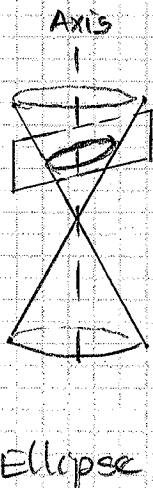
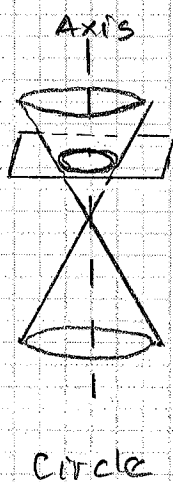
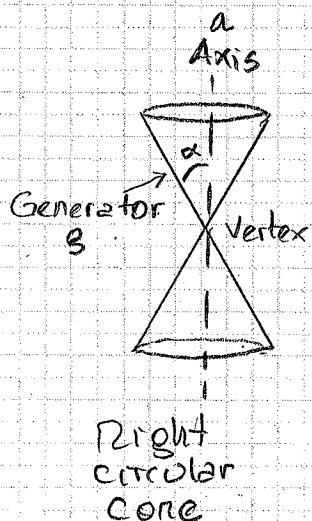


## CONIC SECTIONS



Circle

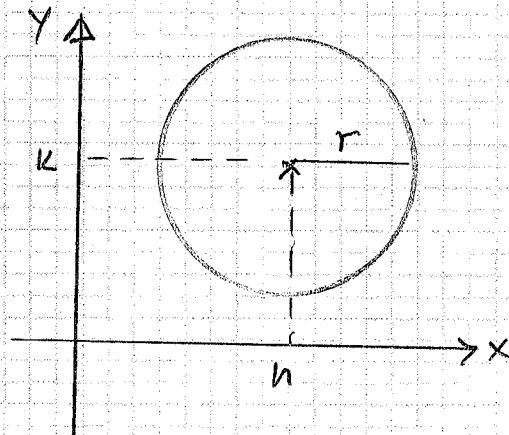
Ellipse

Parabola

Hyperbola

## CIRCLE

$$(x-h)^2 + (y-k)^2 = r^2$$



Example: Find the equation of the circle with radius 4 and center  $(-2, 5)$

$$r = 4 \quad (h, k) = (-2, 5) \quad h = -2 \quad k = 5$$

$$(x - (-2))^2 + (y - 5)^2 = 4^2$$

$$(x + 2)^2 + (y - 5)^2 = 16$$

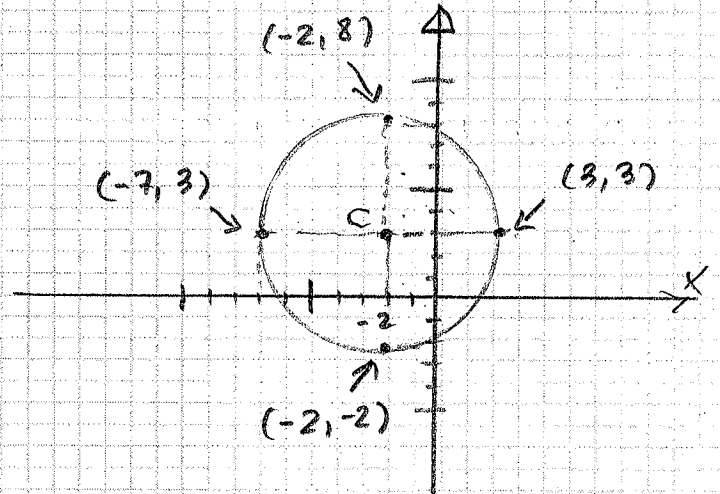
Ex 2: Graph the circle  $(x+2)^2 + (y-3)^2 = 25$

$$(x-h)^2 + (y-k)^2 = r^2$$

$$r^2 = 25 \Rightarrow r = 5$$

$$h = -2 \quad k = 3$$

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



Ex 3:  $(x-h)^2 + (y-k)^2 = r^2$

standard form of the equation of a circle

$$x^2 + y^2 + 4x - 6y - 12 = 0$$

Find the standard form

$$x^2 + 4x + 4 + y^2 - 6y + 9 = 12 + 4 + 9$$

half  $\downarrow$  squared  
 $(+2)$

$(-3)$

$$\left\{ \begin{array}{l} (x+a)^2 = x^2 + 2ax + a^2 \\ (x-a)^2 = x^2 - 2ax + a^2 \end{array} \right.$$

$$(x+2)^2 + (y-3)^2 = 25$$

$$x^2 + y^2 + ax + by + c = 0 \quad \text{General Form}$$

Ex 4: Find the standard form of the equation of a circle with center at the point  $(2, 0)$  and containing the point  $(-1, 2)$

$$(x-h)^2 + (y-k)^2 = r^2$$

$$(x-2)^2 + y^2 = r^2$$

$$(-1-2)^2 + 2^2 = r^2 \Rightarrow 9 + 4 = r^2 \Rightarrow r^2 = 13$$

$$(x-2)^2 + y^2 = 13$$

Ex 5: Find the standard form of the equation of a circle with center  $(-4, 1)$  and tangent to the y-axis

$$(x-h)^2 + (y-k)^2 = r^2$$

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

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

$$r = 4$$

$$(x+4)^2 + (y-1)^2 = 16$$

