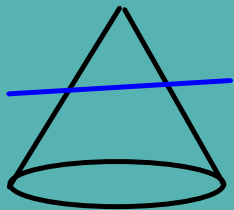
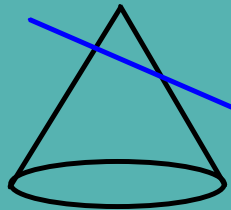


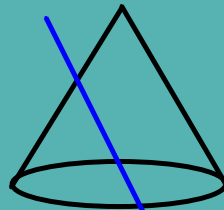
# CONIC SECTIONS - Apollonius



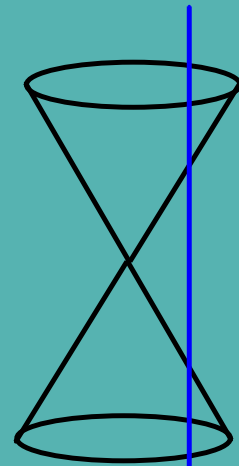
circle



ellipse



parabola

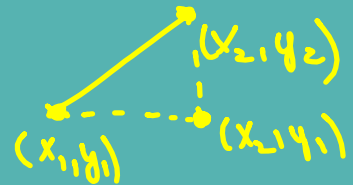


hyperbola

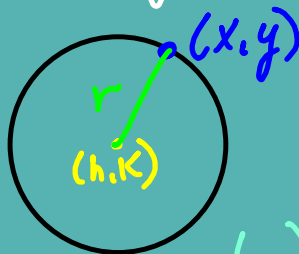
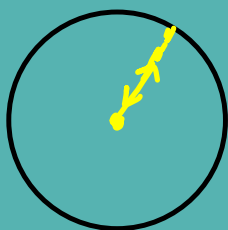
## General Formulas

Distance:  $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Midpoint:  $\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$



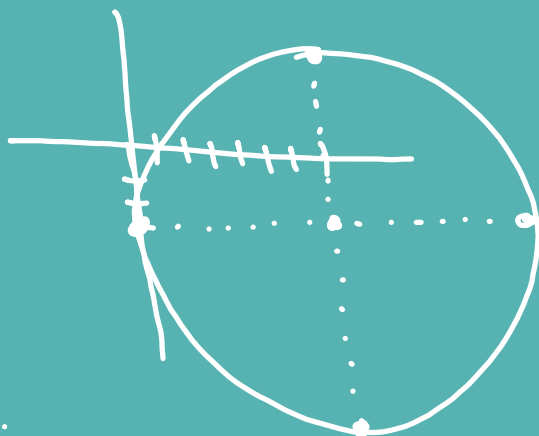
CIRCLES - the set of points equidistant from a given point.



$$(x-7)^2 + (y+3)^2 = 49$$

center:  $(7, -3)$

$$r = \sqrt{49} = 7$$



$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$(r)^2 = \left( \sqrt{(x-h)^2 + (y-k)^2} \right)^2$$

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

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

Center:  $(h, k)$

Radius:  $\sqrt{r^2}$

$$(x+13)^2 + y^2 = 24$$

center:  $(-13, 0)$

$$r = \sqrt{24} = 2\sqrt{6}$$

Circle

$$\frac{2x^2}{2} + \frac{2y^2}{2} + \frac{12x}{2} - \frac{20y}{2} - \frac{4}{2} = \frac{0}{2}$$

$$[x^2 + \underline{6x} + \underline{9}] + [y^2 - 10y + \underline{25}] = 2 + 9 + 25$$

+3                      -5

$$(x+3)^2 + (y-5)^2 = 36$$

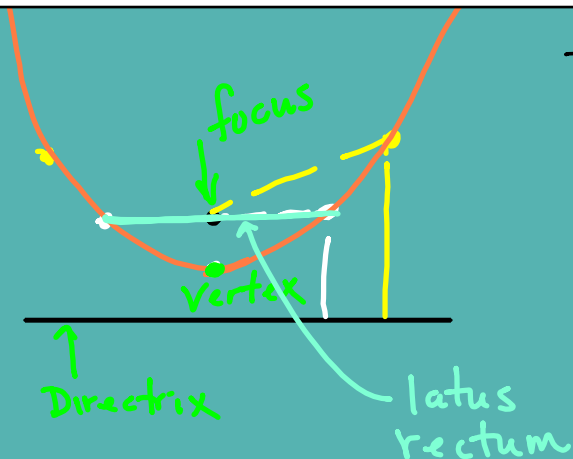
Center:  $(-3, 5)$

$$r = \sqrt{36} = 6$$

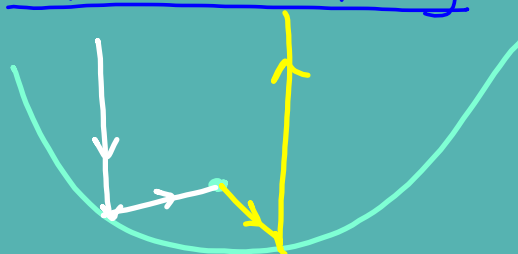
Circles

wheels  
radar  
clock

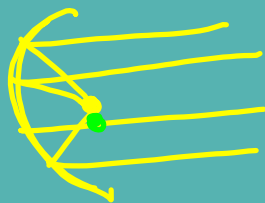
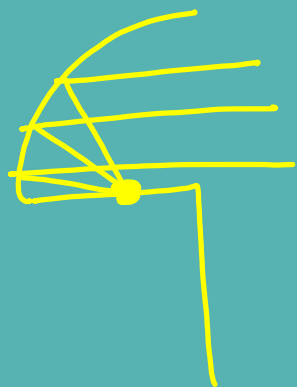
- the set of points equidistant from a given point + a given line.



### Reflective Property



Satellite dish  
amphitheater stage  
Sound at football game  
headlights



# FORMULAS

	$y = a(x-h)^2 + K$	$x = a(y-K)^2 + h$
Vertex $(h, K)$	$(h, K)$	$(h, K)$
line of sym	$x = h$	$y = K$
direction	+a up -a down	+a right -a left
focus	$(h, K + \frac{1}{4a})$	$(h + \frac{1}{4a}, K)$
latus rectum	$ \frac{1}{a} $	$ \frac{1}{a} $

honz  
 $x = +\frac{1}{8}(y-2)^2 + 1$

Vertex:  $(1, 2)$

line of sym:  $y = 2$

Direction = right

focus:  $(1 + \frac{1}{4a}, 2)$   
 $(1 + \frac{1}{4(\frac{1}{8})}, 2)$   
 $(1 + \frac{1}{\frac{1}{2}}, 2)$   
 $(1 + 2, 2)$

Focus  $(3, 2)$

Latus:  $|\frac{1}{\frac{1}{8}}| = 8$

- 1) Plot vertex
- 2) Plot focus
- 3) Put  $\frac{1}{2}$  of latus on each side of focus

