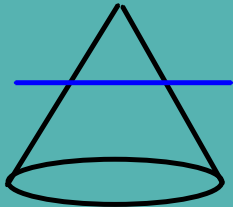
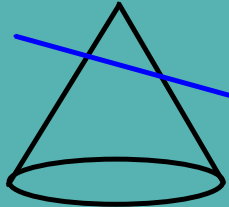


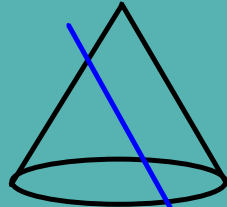
CONIC SECTIONS Apollonius



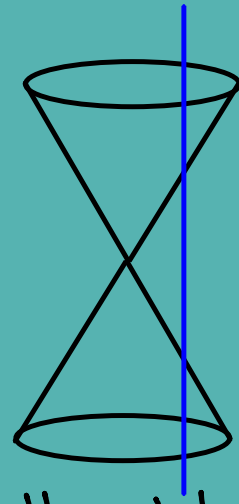
Circle



Ellipse



Parabola

Hyperbola
> <

General

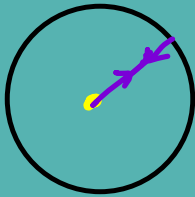


$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

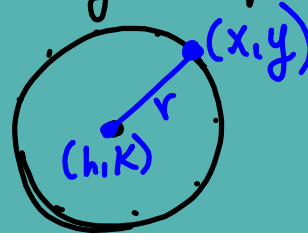
Midpoint

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

Circles



the set of points equidistant from a given point.



- * Wheels
- * pizzas
- * clocks
- * orbits

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

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

Center: (h, k) radius: $\sqrt{r^2} = r$

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

Center: $(7, -3)$

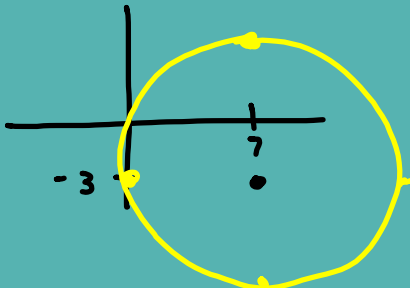
$$\text{radius} = \sqrt{49} = 7$$

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

Center $(-13, 0)$

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

4.6



Circle

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

$$x^2 + y^2 + 6x - 10y - 2 = 0$$

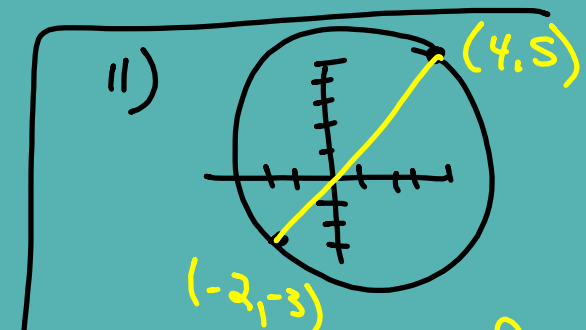
$$x^2 + 6x \underline{+9} + y^2 - 10y \underline{+25} = 2 \underline{+9} \underline{+25}$$

+3 -5

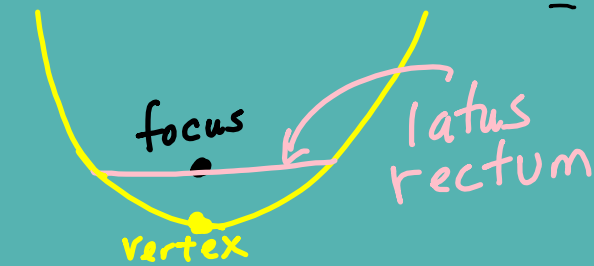
$$(x+3)^2 + (y-5)^2 = 36$$

Center $(-3, 5)$

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

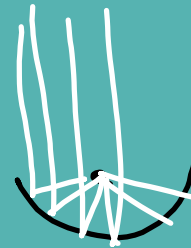
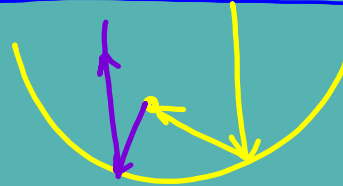


Center: Midpoint formula
radius: Distance formula



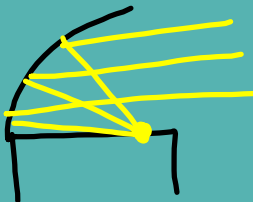
- the set of points equidistant from a given point + a given line.

Reflective Property



satellite dish
sound at football game
headlights
microscope & telescope
mirrors

concert stage



FORMULAS



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

(h, k)

Vertex

line of sym

$$x = h$$

direction

 $+a$ up
 $-a$ down

focus

$$(h, k + \frac{1}{4a})$$

latus rectum

$$\left| \frac{1}{a} \right|$$

horizontal

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

$$(h, k)$$

$$y = k$$

 $+a$ right
 $-a$ left

$$(h + \frac{1}{4a}, k)$$

$$\left| \frac{1}{a} \right|$$

~~$\frac{1}{4a}$~~
 $\frac{1}{4a}$

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

Vertex: $(1, 2)$

Line of Symm: $y = 2$

Direction: right

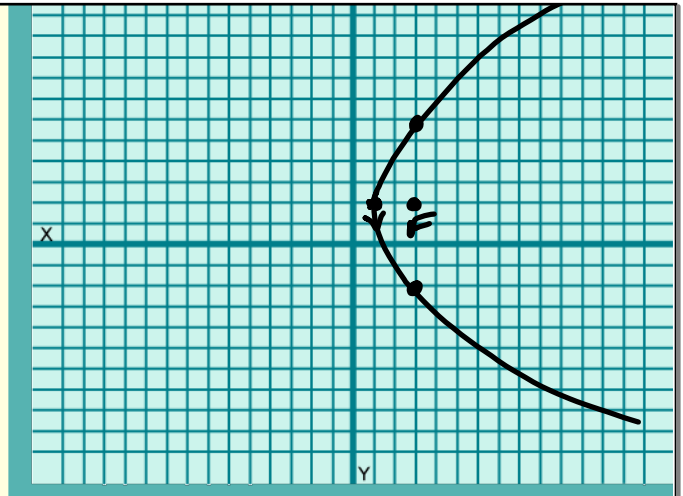
Focus: $(h + \frac{1}{4a}, k)$

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

$$(1 + \frac{1}{\frac{1}{2}}, 2)$$

$$(1 + 2, 2)$$

Focus $(3, 2)$



To graph:

1) Plot vertex

2) Plot focus

3) Count $\frac{1}{2}$ of latus on each side of focus.

$$\text{Latus: } \left| \frac{1}{a} \right| = \left| \frac{1}{\frac{1}{8}} \right| = 8$$