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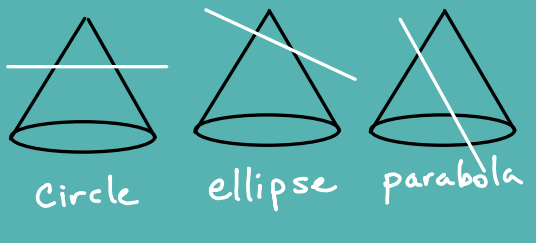
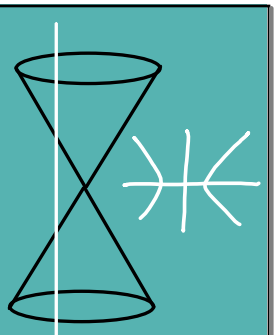
Conic Sections – cross sections of a cone





Apollonius

hyperbola

General Formula	Circles
Parabolas	

Ellipses	Hyperbolas

Distance

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

Midpoint

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

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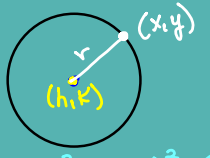
CIRCLES – the set of points equidistant from a given point.

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

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

Center: (h,k)

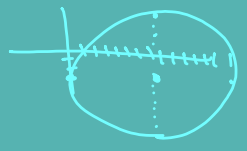
radius: $\sqrt{r^2}=r$



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

Center: $(7,-3)$

$r=\sqrt{49}=7$



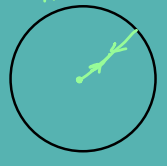
$(x+13)^2+y^2=24$

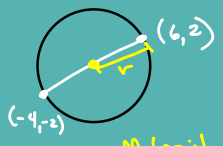
Center: $(-13,0)$

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

$4\cdot 6$

Reflective Prop





Center = Midpoint

radius = Distance formula

Circle

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

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

$$\underbrace{x^2 + 6x + 9}_{+3} + y^2 - 10y + 25 = 2 + 9 + 25$$
$$-5$$

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

Center: $(-3, 5)$

$r = \sqrt{36} = 6$

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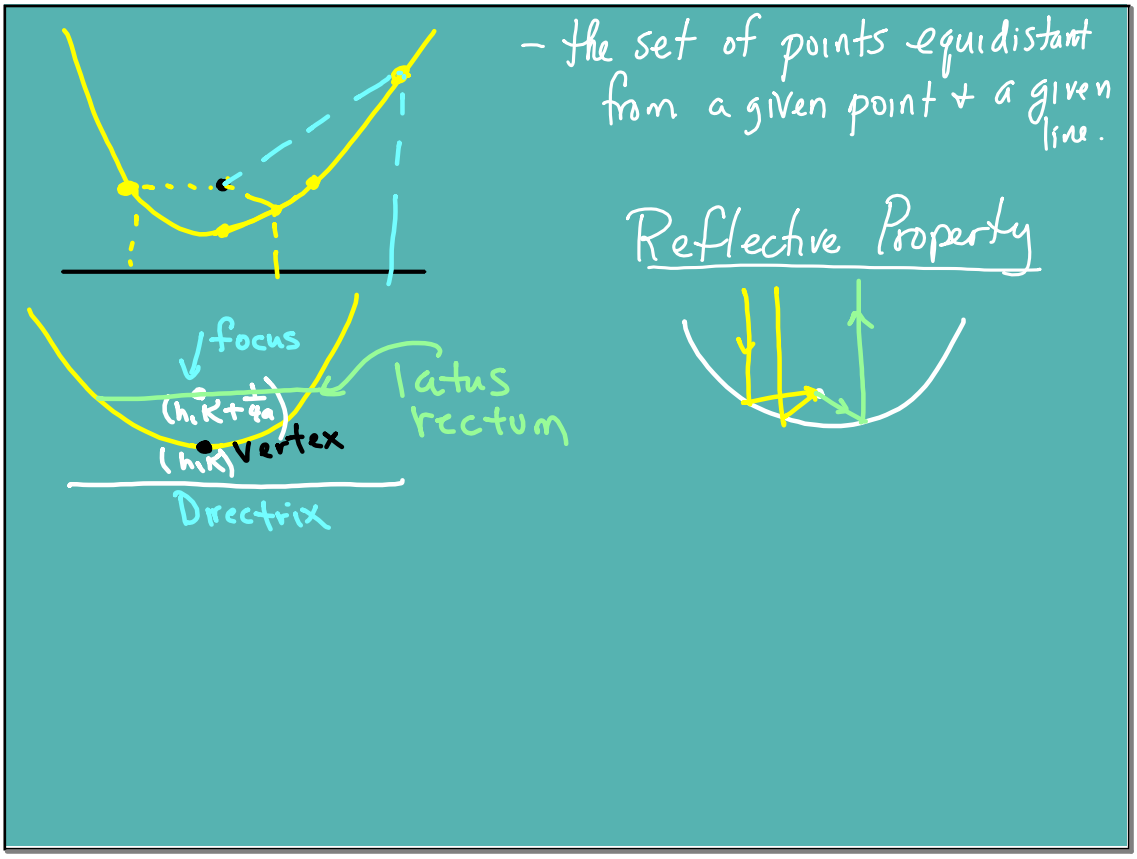

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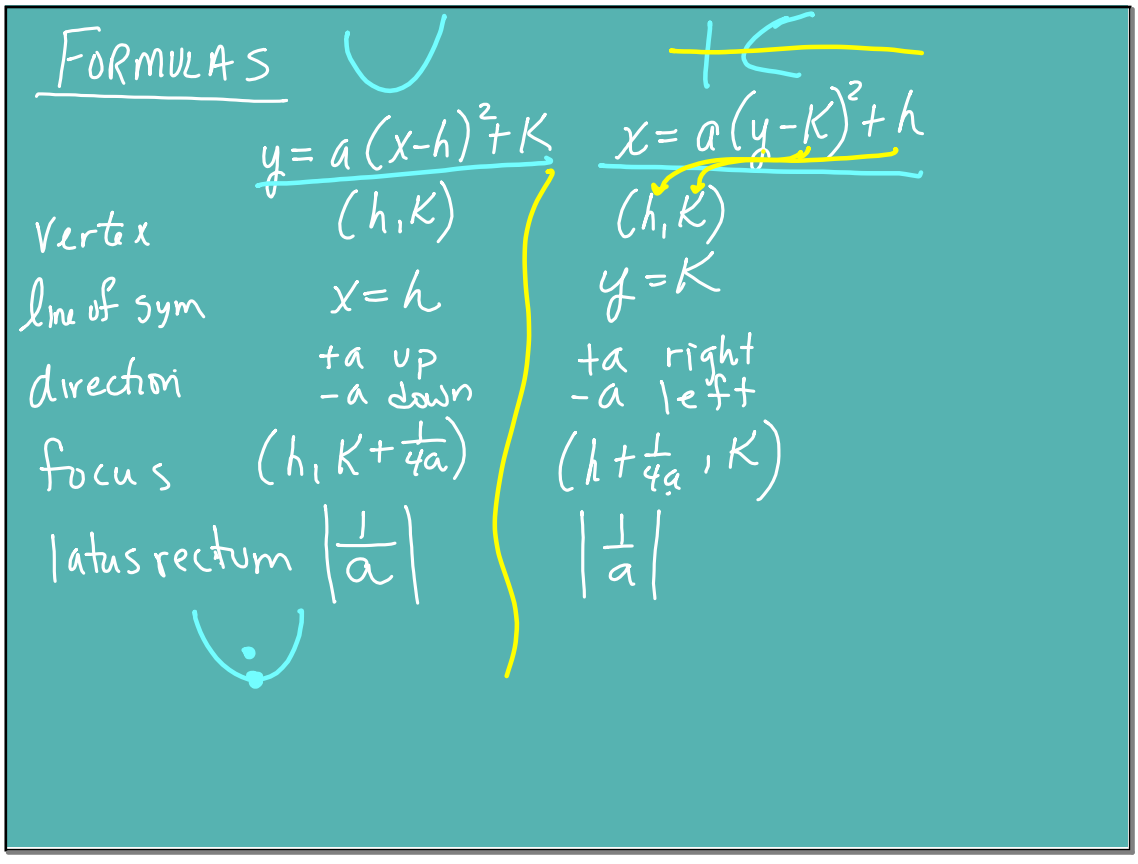


$x = \frac{1}{8}(y-2)^2 + 1$

Vertex: $(1, 2)$

Line of Symm: $y = 2$

Direction: right

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

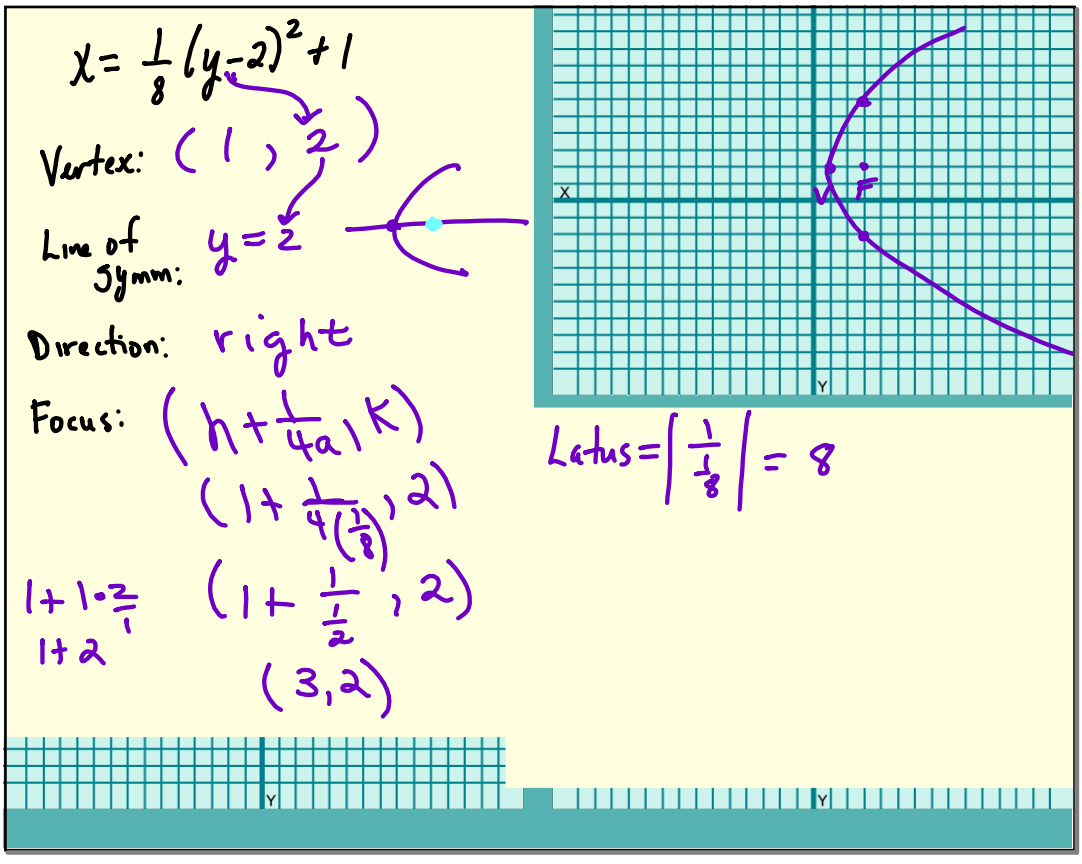
$\left(1 + \frac{1}{4\left(\frac{1}{8}\right)}, 2\right)$

$1 + 1 \cdot \frac{2}{1}$

$1 + 2$

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

$(3, 2)$



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