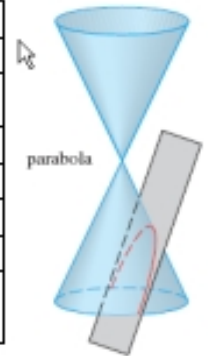
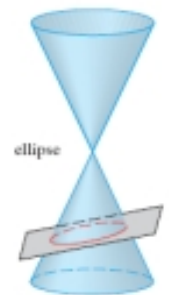


## Conic Sections Formulas

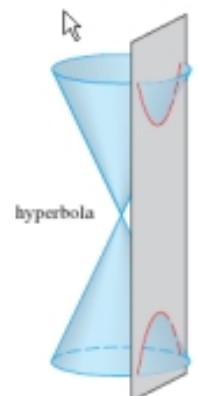
<b>Parabola</b>		
	Vertical Axis	Horizontal axis
equation	$(x-h)^2=4p(y-k)$	$(y-k)^2=4p(x-h)$
Axis of symmetry	$x=h$	$y=k$
Vertex	$(h,k)$	$(h,k)$
Focus	$(h,k+p)$	$(h+p,k)$
Directrix	$y=k-p$	$x=h-p$
Direction of opening	$p>0$ then up; $p<0$ then down	$p>0$ then right; $p<0$ then left



<b>Ellipse</b>		
	Vertical Major Axis	Horizontal Major axis
equation	$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$	$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$
center	$(h,k)$	$(h,k)$
Vertices	$(h,k\pm a)$	$(h\pm a,k)$
Foci	$(h,k\pm c)$	$(h\pm c,k)$
Major axis equation	$2a=\text{length of major axis}$	
Minor axis equation	$2b=\text{length of minor axis}$	
Equation that relates a, b, and c	$a^2=b^2+c^2$	
Eccentricity of an ellipse	$e=(c/a)$	



<b>Hyperbola</b>		
	Vertical Transverse Axis	Horizontal Transverse axis
equation	$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$	$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$
center	$(h,k)$	$(h,k)$
Vertices	$(h,k\pm a)$	$(h\pm a,k)$
Foci	$(h,k\pm c)$	$(h\pm c,k)$
Asymptote equation	$y = k \pm \frac{a}{b}(x-h)$	$y = k \pm \frac{b}{a}(x-h)$
Equation relating a, b, and c	$c^2=a^2+b^2$	



<b>Classifying conic sections</b>	<b>Circles</b>	<b>Parabola</b>	<b>Ellipse</b>	<b>Hyperbola</b>
$Ax^2+Cy^2+Dx+Ey+F=0$	$A=C$	$AC=0$ , Both are not 0	$AC>0$	$AC<0$