

# FREEBIE!

**Conic Sections Formula Sheet**

**Circles:**

	Center at Origin	Center at $(h, k)$
Standard Form	$x^2 + y^2 = r^2$	$(x - h)^2 + (y - k)^2 = r^2$
Radius:	$r$	$r$
Diameter:	$2r$	$2r$

**Parabolas:**

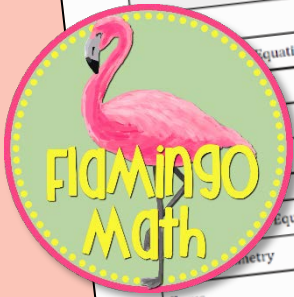
**Parabolas centered at the Origin:**

	Vertical	Horizontal
Equation	$x^2 = 4cy$	$y^2 = 4cx$
Vertex	$x = 0$	$y = 0$
Focus	$(0, c)$	$(c, 0)$
Directrix	$y = -c$	$x = -c$

**Parabolas centered at  $(h, k)$**

	Vertical	Horizontal
Equation	$(x - h)^2 = 4c(y - k)$	$(y - k)^2 = 4c(x - h)$
Vertex	$x = h$	$y = k$
Focus	$(h, k + c)$	$(h + c, k)$
Directrix	$y = k - c$	$x = h - c$

Right if  $c > 0$



**Ellipses:**

**Horizontal Ellipses:**

Equation	Standard Form	Center
	$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	$(0, 0)$

**Vertical Ellipses:**

Equation	Standard Form	Center
	$\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$	$(0, 0)$

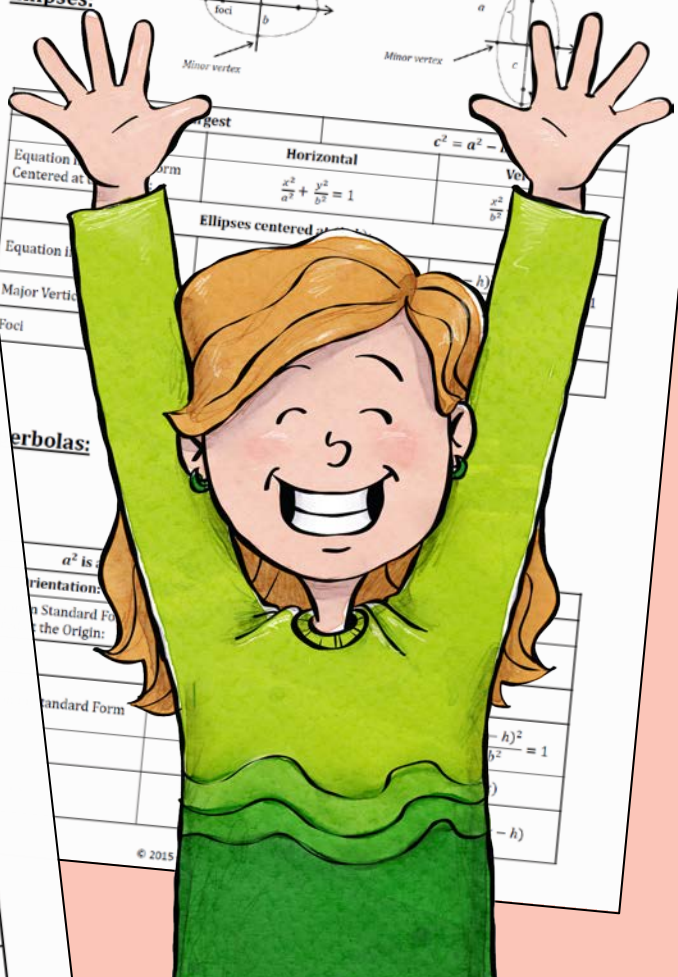
**Parabolas:**

$a^2$  is ...

Orientation: ...

Standard Form ...

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# CONIC SECTIONS REFERENCE SHEET

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## Conic Sections Reference Sheet

Here is a complete reference sheet for students to use while mastering the details of conic sections. You can print this reference sheet and use it in a variety of ways:

- 1) Run on colorful card stock, laminate, and sell as a fund-raiser for your department.
- 2) Copy and have students place them in their Interactive Notebooks.
- 3) Allow students to use your class set as a reference on Chapter quizzes or tests.

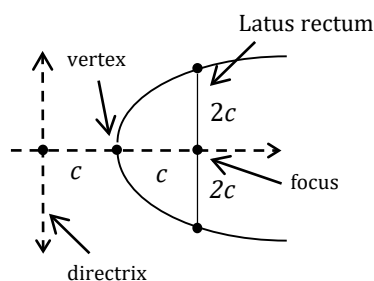
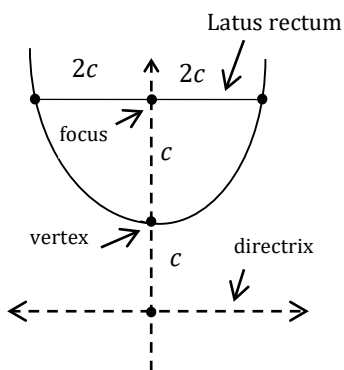
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# Conic Sections Formula Sheet

## Circles:

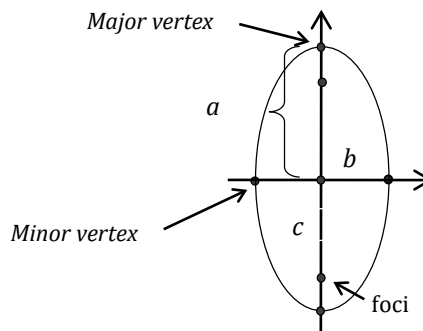
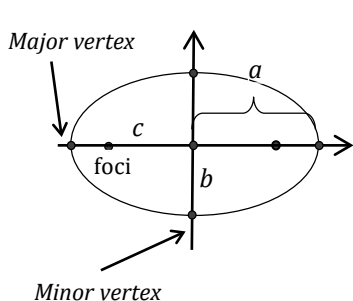
	Center at Origin	Center at $(h, k)$
<b>Standard Form</b>	$x^2 + y^2 = r^2$	$(x - h)^2 + (y - k)^2 = r^2$
<b>Radius:</b>	$r$	$r$
<b>Diameter:</b>	$2r$	$2r$

## Parabolas:



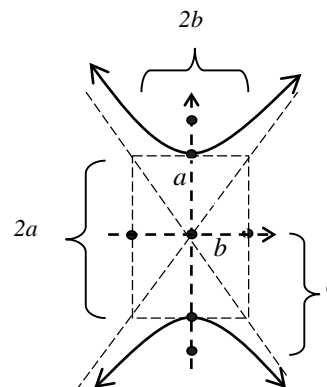
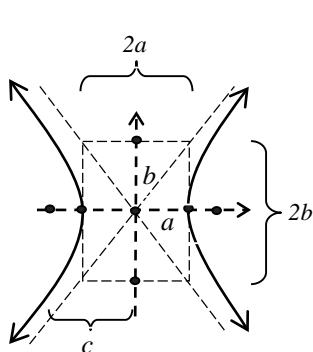
Parabolas centered at the Origin:		
Orientation:	Vertical	Horizontal
Standard Form of Equation	$x^2 = 4cy$	$y^2 = 4cx$
Axis of Symmetry	$x = 0$	$y = 0$
Focus	$(0, c)$	$(c, 0)$
Directrix	$y = -c$	$x = -c$
Parabolas centered at $(h, k)$		
Standard Form of Equation	$(x - h)^2 = 4c(y - k)$	$(y - k)^2 = 4c(x - h)$
Axis of Symmetry	$x = h$	$y = k$
Focus	$(h, k + c)$	$(h + c, k)$
Directrix	$y = k - c$	$x = h - c$
Opening	Upward if $c > 0$ Downward if $c < 0$	Right if $c > 0$ Left if $c < 0$

## Ellipses:



$a^2$ is always largest		$c^2 = a^2 - b^2$	
Orientation:	Horizontal	Vertical	
Equation in Standard Form Centered at the Origin:	$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$	$\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$	
<b>Ellipses centered at <math>(h, k)</math>:</b>			
Equation in Standard Form	$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$	$\frac{(x - h)^2}{b^2} + \frac{(y - k)^2}{a^2} = 1$	
Major Vertices	$(h \pm a, k)$	$(h, k \pm a)$	
Foci	$(h \pm c, k)$	$(h, k \pm c)$	

## Hyperbolas:



$a^2$ is always first		$c^2 = a^2 + b^2$	
Orientation:	Horizontal	Vertical	
Equation in Standard Form Centered at the Origin:	$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$	$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$	
<b>Hyperbolas centered at <math>(h, k)</math>:</b>			
Equation in Standard Form	$\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$	$\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{b^2} = 1$	
Foci	$(h \pm c, k)$	$(h, k \pm c)$	
Asymptotes	$y - k = \pm \frac{b}{a}(x - h)$	$y - k = \pm \frac{a}{b}(x - h)$	

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