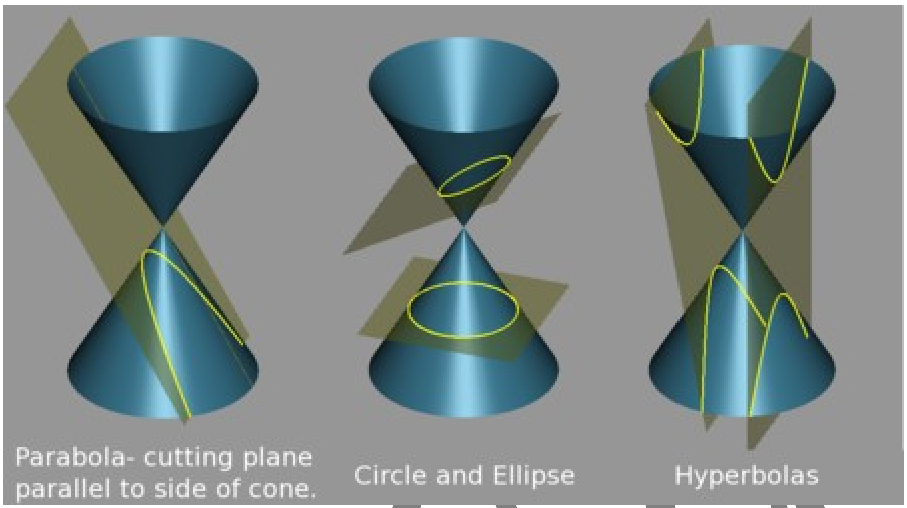
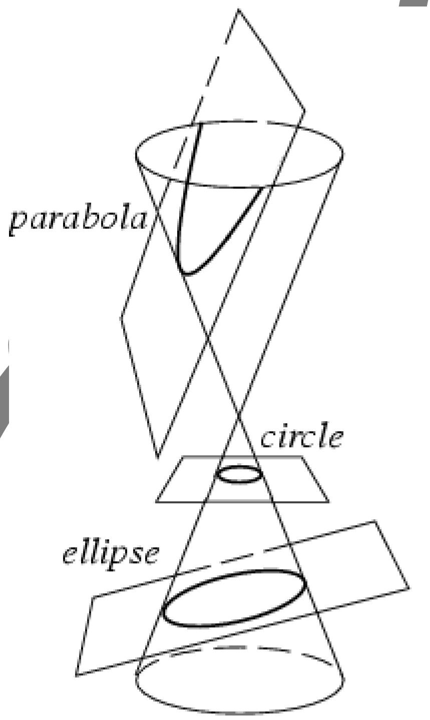
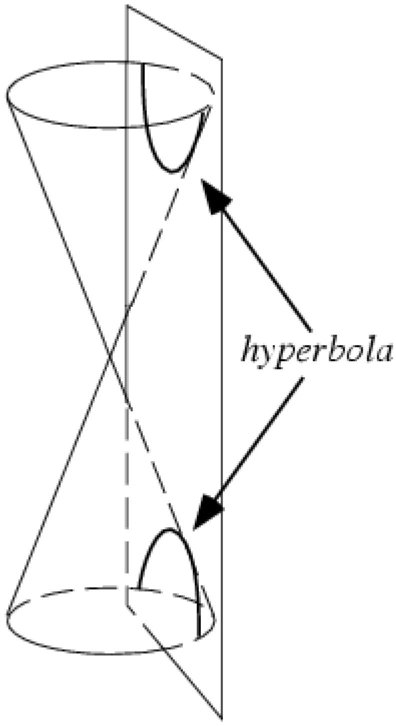
Pictures of the Conic Sections

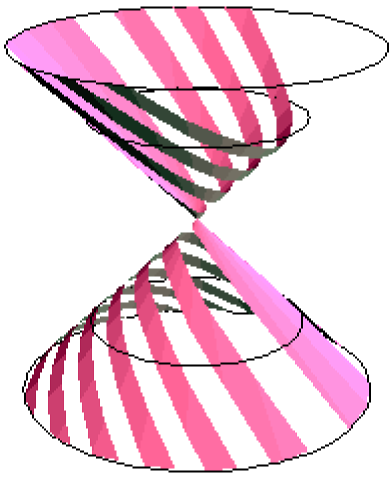




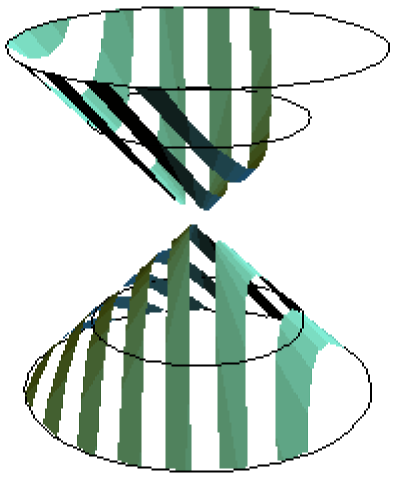


Ellipses

Parabolas



Hyperbolas



Picture Courtesy: Susan Whitehouse, TES

Parabola:

Equations	$y^2 = 4ax$ (right)	$y^2 = -4ax$ (left)	$x^2 = 4ay$ (up)	$x^2 = -4ay$ (down)
Vertex	V(0, 0)	V(0, 0)	V(0, 0)	V(0, 0)
Focus	F(a, 0)	F(- a, 0)	F(0, a)	F(0, - a)
Eqn. Of axis	X axis(y = 0)	X axis(y = 0)	y axis(x = 0)	y axis(x = 0)
Eqn. Of directrix	x = - a	x = a	y = - a	y = a
LL'	4a	4a	4a	4a

- Point (x_1, y_1) lies outside the parabola $y^2 = 4ax$ if $(y_1)^2 > 4ax_1$
- Point (x_1, y_1) lies inside the parabola $y^2 = 4ax$ if $(y_1)^2 < 4ax_1$
- Point (x_1, y_1) lies on the parabola $y^2 = 4ax$ if $(y_1)^2 = 4ax_1$
- For a parabola eccentricity, e = 1
- For any point on a parabola, its distance from the focus = distance from the directrix.

Ellipse:

- The sum of distances of any point on the ellipse from its foci is a constant (= 2a)
- $e < 1$; $c^2 = a^2 - b^2$ $a^2 > b^2$

Equation	$x^2/a^2 + y^2/b^2 = 1$	$x^2/b^2 + y^2/a^2 = 1$
Centre	(0, 0)	(0, 0)
Vertices	V(± a, 0)	V(0, ± a)
Foci	F(± c, 0)	F(0, ± c)
Length of major axis	2a	2a
Length of minor axis	2b	2b
Length of latus rectum	$2b^2/a$	$2b^2/a$
Eccentricity , e	c/a	c/a
Distance between foci	2c	2c
Eqn. Of directrix	$x = \pm a^2/c$	$y = \pm a^2/c$
Eqn. Of latus rectum	$x = \pm c$	$y = \pm c$

Hyperbola:

- The difference of distances of any point on the hyperbola from its foci is a constant (= 2a)
- $e > 1$; $c^2 = a^2 + b^2$

Equation	$x^2/a^2 - y^2/b^2 = 1$	$y^2/a^2 - x^2/b^2 = 1$
Centre	(0, 0)	(0, 0)
Vertices	V(± a, 0)	V(0, ± a)
Foci	F(± c, 0)	F(0, ± c)
Length of transverse axis	2a	2a
Length of conjugate axis	2b	2b
Length of latus rectum	$2b^2/a$	$2b^2/a$
Eccentricity , e	c/a	c/a
Distance between foci	2c	2c
Eqn. Of directrix	$x = \pm a^2/c$	$y = \pm a^2/c$
Eqn. Of latus rectum	$x = \pm c$	$y = \pm c$