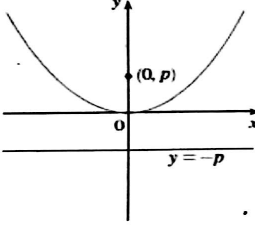
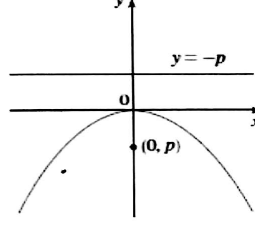
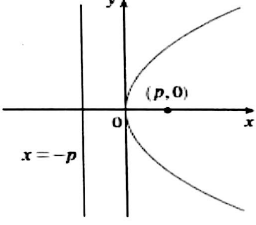
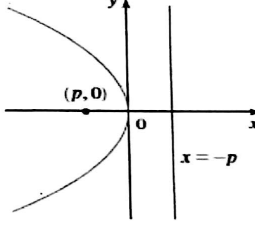


10.5- The Cartesian equation of conics: (1) parabolas

$a) y^2 = 4px$	$b) x^2 = 4py$	$c) (y - k)^2 = 4p(x - h)$	$d) (x - h)^2 = 4p(y - k)$
Vertex: (0,0)	Vertex: (0,0)	Vertex: (h,k)	Vertex: (h,k)
Focus: (p, 0)	Focus: (0, p)	Focus: (p + h, k)	Focus: (h, p + k)
Axis: x axis (y = 0)	Axis: y axis (x = 0)	Axis: // x axis (y = k)	Axis: // y axis (x = h)
Directrix: x = -p	Directrix: y = -p	Directrix: x = -p + h	Directrix: y = -p + k
 (a) $x^2 = 4py, p > 0$	 (b) $x^2 = 4py, p < 0$	 (c) $y^2 = 4px, p > 0$	 (d) $y^2 = 4px, p < 0$

2) Ellipses

A) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (if $a > b$)	B) $\frac{y^2}{a^2} + \frac{x^2}{b^2} = 1$ (if $a > b$)	C) $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ (if $a > b$)	D) $\frac{(y-k)^2}{a^2} + \frac{(x-h)^2}{b^2} = 1$ (if $a > b$)
Center: (0,0)	Center: (0,0)	Center: (h,k)	Center: (h,k)
Vertices : ($\pm a, 0$)	Vertices : (0, $\pm a$)	Vertices : ($h \pm a, k$)	Vertices : (h, $k \pm a$)
Foci: ($\pm c, 0$) Where $c^2 = a^2 - b^2$	Foci: (0, $\pm c$) Where $c^2 = a^2 - b^2$	Foci: ($h \pm c, k$) Where $c^2 = a^2 - b^2$	Foci: (h, $k \pm c$) Where $c^2 = a^2 - b^2$
The Major Axis: x axis ($y = 0$)	The Major Axis: y axis ($x = 0$)	The Major Axis: // x axis ($y = k$)	The Major Axis: // y axis ($x = h$)
Minor axis: y axis ($x = 0$)	Minor axis: x axis ($y = 0$)	Minor axis: // y axis ($x = h$)	Minor axis: // x axis ($y = k$)

Note:

- 1) The length of major axis $2a$ and the length of minor axis $2b$
- 2) The focal length is $2c$
- 3) The point on the minor axis is A) $(0, \pm b)$ B) $(\pm b, 0)$ C) $(h, k \pm b)$
D) $(h \pm b, k)$

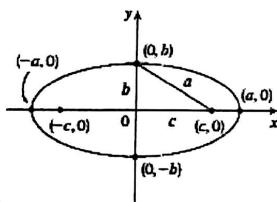


FIGURE 8
 $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

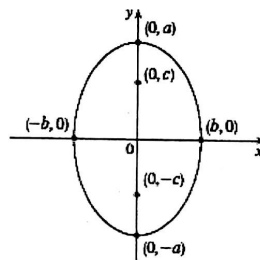


FIGURE 9
 $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1, a \geq b$

3) Hyperbola

A) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (if $a > 0$)	B) $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$ (if $a > 0$)	C) $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$ (if $a > 0$)	D) $\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$ (if $a > 0$)
Center: (0,0)	Center: (0,0)	Center: (h,k)	Center: (h,k)
Vertices : ($\pm a$, 0)	Vertices : (0, $\pm a$)	Vertices : ($h \pm a$, k)	Vertices : (h, $k \pm a$)
Foci: ($\pm c$, 0) Where $c^2 = a^2 + b^2$	Foci: (0, $\pm c$) Where $c^2 = a^2 + b^2$	Foci: ($h \pm c$, k) Where $c^2 = a^2 + b^2$	Foci: (h, $k \pm c$) Where $c^2 = a^2 + b^2$
Axis: x axis ($y = 0$)	Axis: y axis ($x = 0$)	Axis: // x axis ($y = k$)	Axis: // y axis ($x = h$)
asymptotes: $y = \pm \frac{b}{a}x$	asymptotes: $y = \pm \frac{a}{b}x$	asymptotes: $y - k = \pm \frac{b}{a}(x - h)$	asymptotes: $y - k = \pm \frac{a}{b}(x - h)$

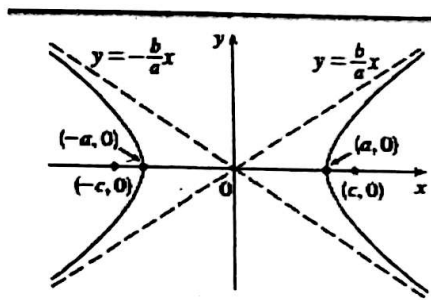


FIGURE 12

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

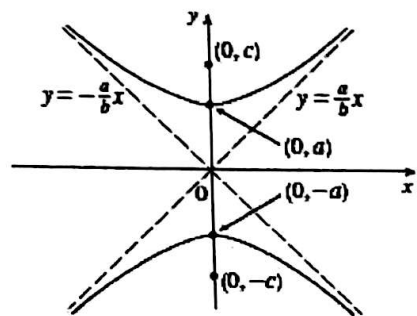


FIGURE 13

$$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$$