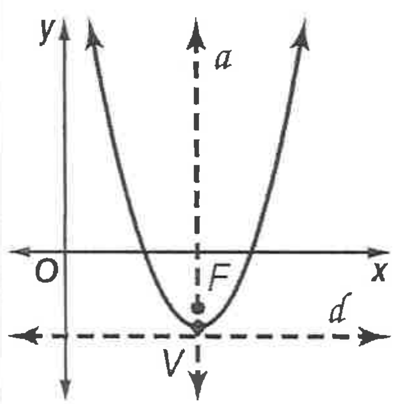
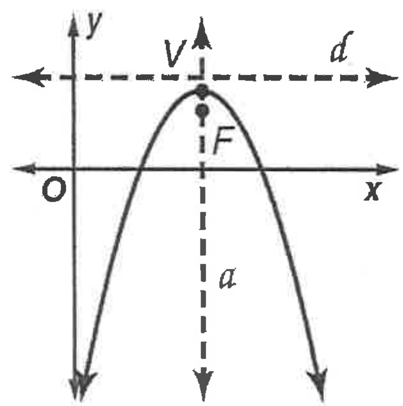
CHAPTER 7 NOTES FOR CONIC SECTIONS

KeyConcept Standard Form of Equations for Parabolas

$(x-h)^2 = 4p(y-k)$



$p > 0$



$p < 0$

Orientation: opens vertically

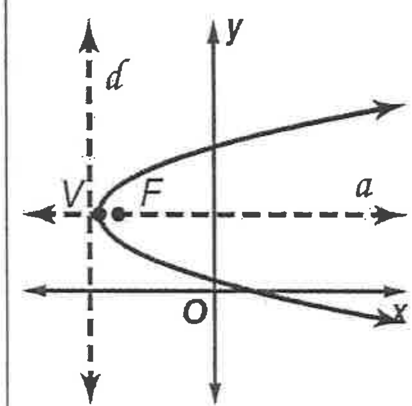
Vertex: (h, k)

Focus: $(h, k + p)$

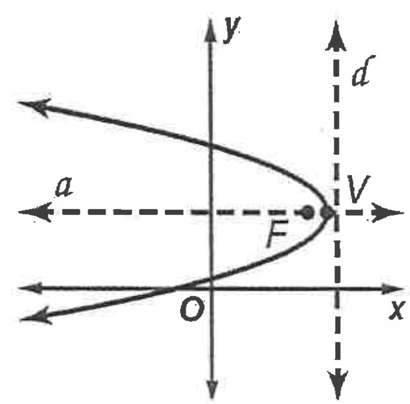
Axis of Symmetry a: $x = h$

Directrix d: $y = k - p$

$(y-k)^2 = 4p(x-h)$



$p > 0$



$p < 0$

Orientation: opens horizontally

Vertex: (h, k)

Focus: $(h + p, k)$

Axis of Symmetry a: $y = k$

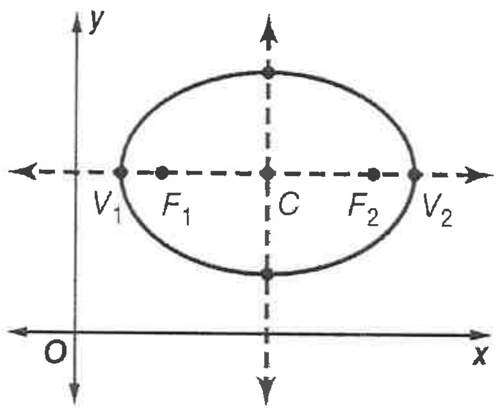
Directrix d: $x = h - p$

eccentricity = "stretch" or how circular an ellipse is.

$e = \frac{c}{a}$

KeyConcept Standard Forms of Equations for Ellipses

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$



Orientation: horizontal major axis

Center: (h, k)

Foci: $(h \pm c, k)$

Vertices: $(h \pm a, k)$

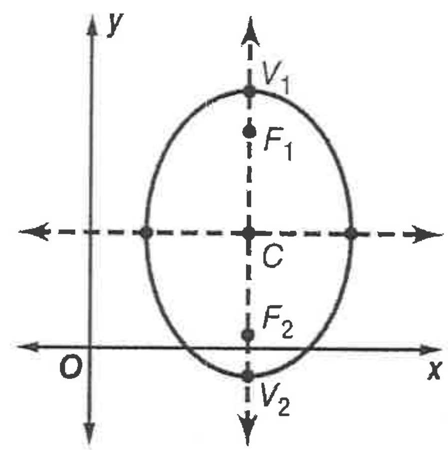
Co-vertices: $(h, k \pm b)$

Major axis: $y = k$

Minor axis: $x = h$

***a*, *b*, *c* relationship:** $c^2 = a^2 - b^2$ or $c = \sqrt{a^2 - b^2}$

$$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$$



Orientation: vertical major axis

Center: (h, k)

Foci: $(h, k \pm c)$

Vertices: $(h, k \pm a)$

Co-vertices: $(h \pm b, k)$

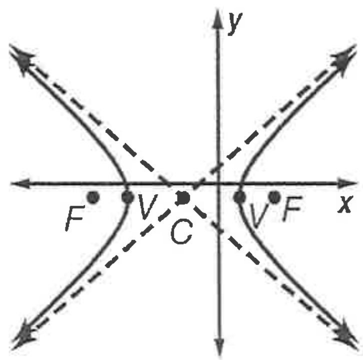
Major axis: $x = h$

Minor axis: $y = k$

***a*, *b*, *c* relationship:** $c^2 = a^2 - b^2$ or $c = \sqrt{a^2 - b^2}$

KeyConcept Standard Forms of Equations for Hyperbolas

$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$



Orientation: horizontal transverse axis

Center: (h, k)

Vertices: $(h \pm a, k)$

Foci: $(h \pm c, k)$

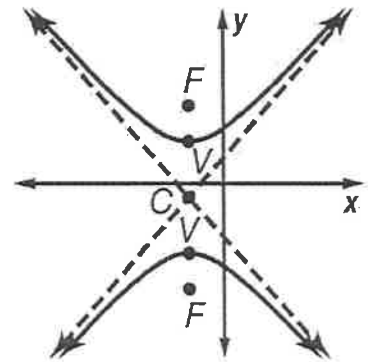
Transverse axis: $y = k$

Conjugate axis: $x = h$

Asymptotes: $y - k = \pm\frac{b}{a}(x - h)$

***a*, *b*, *c* relationship:** $c^2 = a^2 + b^2$ or $c = \sqrt{a^2 + b^2}$

$$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$$



Orientation: vertical transverse axis

Center: (h, k)

Vertices: $(h, k \pm a)$

Foci: $(h, k \pm c)$

Transverse axis: $x = h$

Conjugate axis: $y = k$

Asymptotes: $y - k = \pm\frac{a}{b}(x - h)$

***a*, *b*, *c* relationship:** $c^2 = a^2 + b^2$ or $c = \sqrt{a^2 + b^2}$