

Math Conic Worksheet

MATH CONIC WORKSHEET

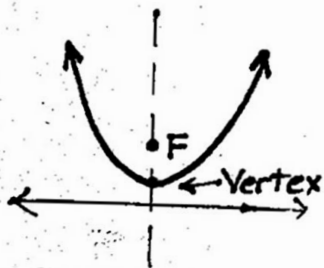
CIRCLE



Equation $(x-h)^2 + (y-k)^2 = r^2$
 Conic $Ax^2 + By^2 + Cx + Dy + F = 0$
 $A = B$ (neither is zero)

Center = (h, k)
 radius = r

PARABOLA

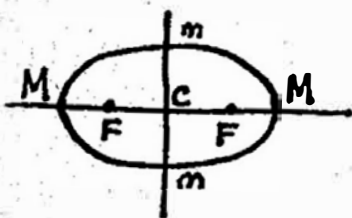


Equation $y = \frac{1}{4p}(x-h)^2 + k$
 Vertex: (h, k)
 Focus: $(h, k+p)$
 Directrix: $y = k-p$
 CONIC $A=0$ or $B=0$

VERTICAL

Equation $x = \frac{1}{4p}(y-k)^2 + h$
 Vertex (h, k)
 Focus: $(h+p, k)$
 Directrix: $x = h-p$

ELLIPSE



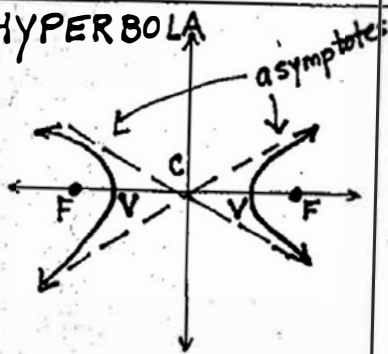
$A \neq B$ but $A > 0$
 $B > 0$

Equation $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$
 center: (h, k)
 Foci: $(h + \sqrt{a^2 - b^2}, k)$
 $(h - \sqrt{a^2 - b^2}, k)$
 Major extrema: $(h+a, k)$
 $(h-a, k)$
 minor extrema: $(h, k+b)$
 $(h, k-b)$

same, but $b > a$

Center: (h, k)
 Foci: $(h, k + \sqrt{b^2 - a^2})$
 $(h, k - \sqrt{b^2 - a^2})$
 Major: $(h, k+b)$
 $(h, k-b)$
 minor: $(h+a, k)$
 $(h-a, k)$

HYPERBOLA



Equation $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$
 center: (h, k)
 Vertices: $(h+a, k)$
 $(h-a, k)$
 Foci: $(h + \sqrt{a^2 + b^2}, k)$
 $(h - \sqrt{a^2 + b^2}, k)$
 Asymptotes: $y - k = \pm \frac{b}{a}(x - h)$

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

Center: (h, k)
 Vertices: $(h, k+b)$
 $(h, k-b)$
 Foci: $(h, k + \sqrt{a^2 + b^2})$
 $(h, k - \sqrt{a^2 + b^2})$
 Asymptotes: $y - k = \pm \frac{a}{b}(x - h)$