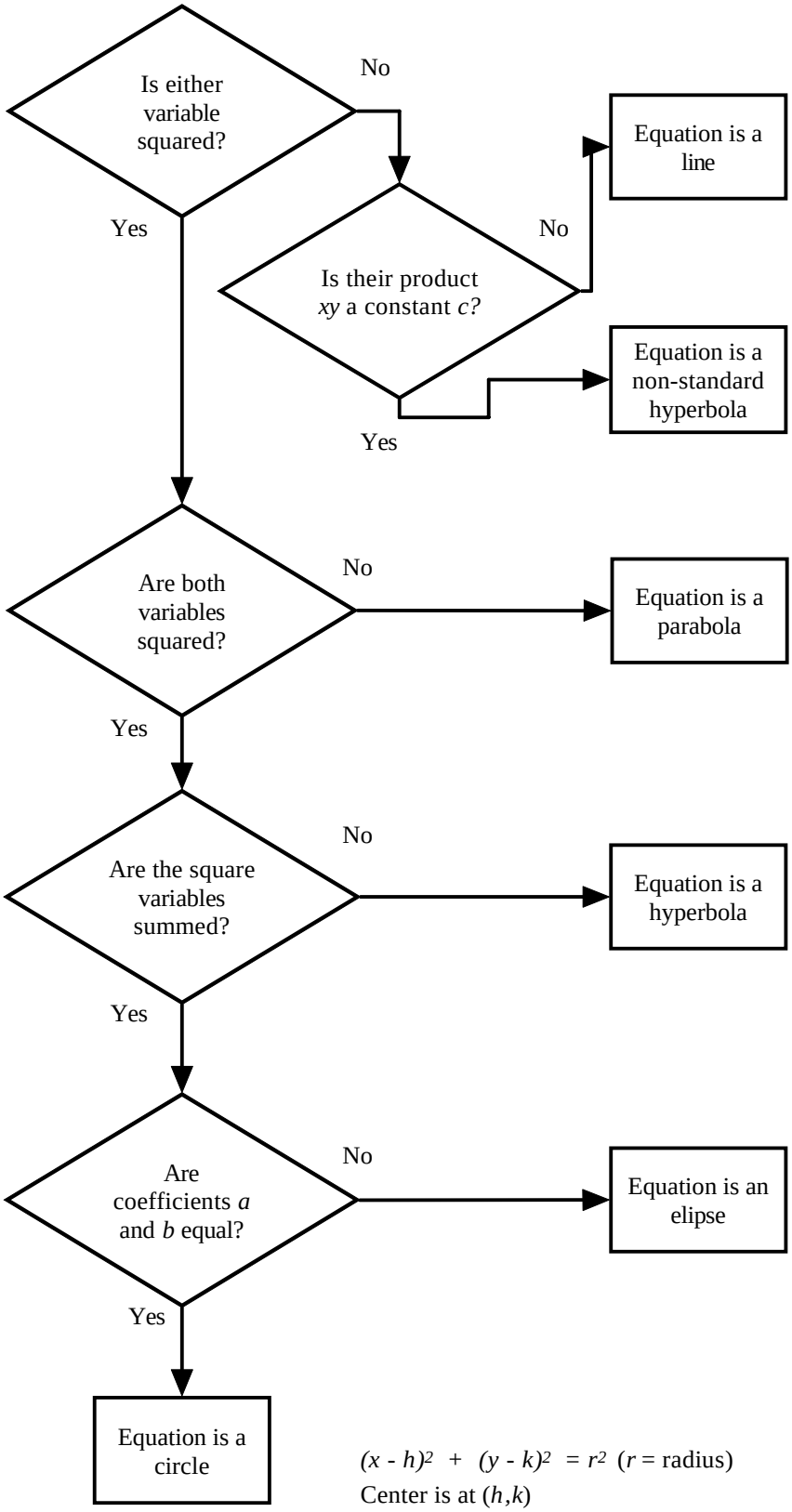
Conic Sections: Classifying Equations (2 variables)



Slope $\frac{(y_2 - y_1)}{(x_2 - x_1)} = m$

Point Slope $y - y_1 = m(x - x_1)$

Slope Intercept $y = mx + b$

Standard form $Ax + By = C$

Distance between two points

$d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$

Midpoint of a line is $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

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x and y cannot equal 0, so graph never reaches 0

To graph, make table and plot points

$y = ax^2 + bx + c$ is vertical parabola

$a > 0$ opens up, $a < 0$ opens down

vertex is (h,k) of $y = a(x - h)^2 + k$

$x = ay^2 + by + c$ is a horizontal parabola

$a > 0$ opens right, $a < 0$ opens left

vertex is (h,k) of $x = a(y-h)^2 + k$

Horizontal axis $x^2 - y^2$

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

Vertices are at $(h, k+b)$ and $(h, k-b)$

Vertical axis $y^2 - x^2$

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

Vertices are at $(h-a, k)$ and $(h+a, k)$

Center is at (h, k)

Asymptotes are $y - k = (b/a)(x - h)$ and $y - k = -(b/a)(x - h)$

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

Center is at (h, k)

Vertices: $(h-a, k)$, $(h+a, k)$, $(h, k-b)$, $(h, k+b)$

$(x - h)^2 + (y - k)^2 = r^2$ (r = radius)

Center is at (h,k)

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