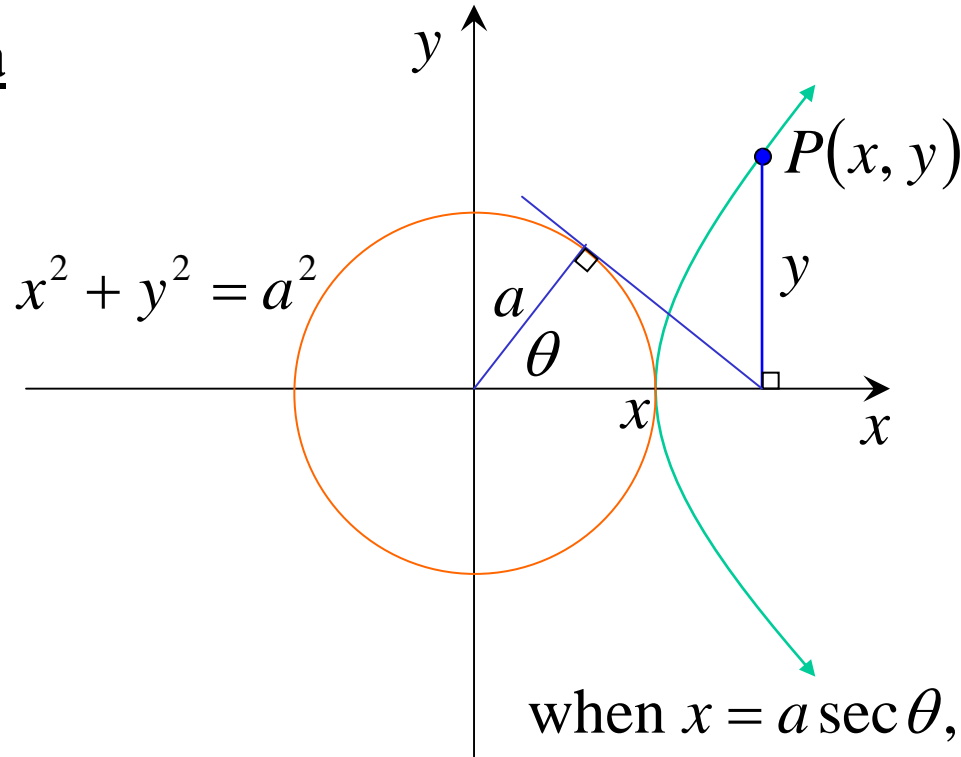


Conics & Parameters

3) Hyperbola



$$\frac{x}{a} = \sec \theta$$

$$x = a \sec \theta \quad y = b \tan \theta$$

$$\text{when } x = a \sec \theta, \frac{a^2 \sec^2 \theta}{a^2} - \frac{y^2}{b^2} = 1$$

$$\frac{y^2}{b^2} = \sec^2 \theta - 1$$

$$y^2 = b^2 \tan^2 \theta$$

$$y = b \tan \theta$$

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

tangent at (x_1, y_1)

$$\frac{x_1 x}{a^2} - \frac{y_1 y}{b^2} = 1$$

normal at (x_1, y_1)

$$\frac{a^2 x}{x_1} + \frac{b^2 y}{y_1} = a^2 + b^2$$

tangent at $(a \sec \theta, b \tan \theta)$

$$\frac{x \sec \theta}{a} - \frac{y \tan \theta}{b} = 1$$

normal at $(a \sec \theta, b \tan \theta)$

$$\frac{ax}{\sec \theta} + \frac{by}{\tan \theta} = a^2 + b^2$$

$$y = \sec f(x)$$

$$\frac{dy}{dx} = f'(x) \sec f(x) \tan f(x)$$

$$y = \tan f(x)$$

$$\frac{dy}{dx} = f'(x) \sec^2 f(x)$$

Exercise 6C; 5, 7, 9, 16, 17