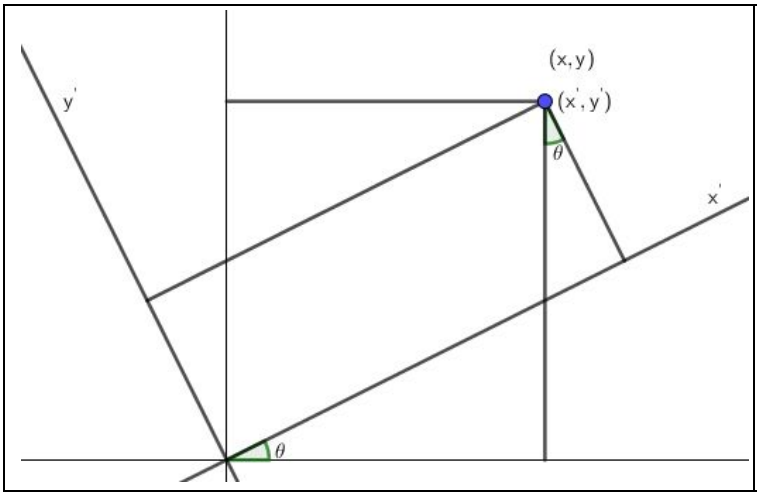
Class Discussion

Unit 9 Topic 3 Part 3 Rotation of Axes of conic sections



$$\begin{cases} x = x'\cos\theta - y'\sin\theta \\ y = x'\sin\theta + y'\cos\theta \end{cases}$$

or

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix} \begin{pmatrix} x' \\ y' \end{pmatrix}$$

Objective 1: student will understand the proof of the transformation of rotation of axes

Objective 2: choose a θ so that a conic in general form can be classified into circle, ellipse, parabola or hyperbolas

Given a general form of a conic section $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$ if θ is chosen to satisfy $\cot 2\theta = \dfrac{A - C}{B}$ between coordinates of (x, y) and (x', y') then the general form can be written in

$$A'(x')^2 + C(y')^2 + D'x' + E'y' + F' = 0$$

Ex: Classify $x^2 + 4xy + 4y^2 - 5x - y - 3 = 0$