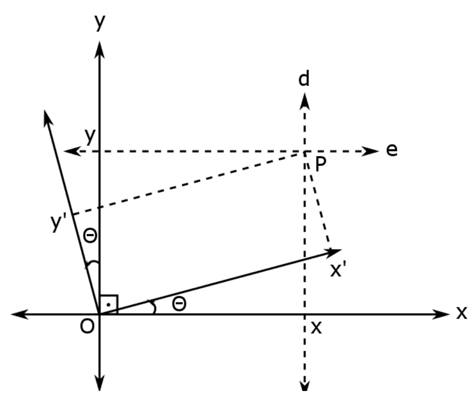
C. Rotation of Coordinate axes and Application:

A transformation which rotates (turns) all points of a figure through the same angle Θ about a given point O is called a *rotation*.

The point O is the *center of rotation* and Θ the *angle of rotation.* Θ is considered positive (negative) when measured counterclockwise (clockwise).

A rotation with center at the origin and with angle Θ rotates the coordinate system Oxy into a new coordinate system Ox′y′.



To obtain the transforming formulas for coordinates x, y and x′, y′ of the same point P in the systems Oxy and Ox′y′, consider the lines d and e through P and perpendicular to Ox and Oy respectively.

The normal equations of d and e in Oxy system are

$$\begin{cases} d : x' \cos(-\Theta) + y' \sin(-\Theta) - x = 0 \\ e : x' \cos(\frac{\pi}{2} - \Theta) + y' \sin(\frac{\pi}{2} - \Theta) - y = 0 \end{cases}$$

or

$$\begin{cases} x' \cos\Theta - y' \sin\Theta - x = 0 \\ x' \sin\Theta + y' \cos\Theta - y = 0 \end{cases}$$

from which we have the transforming formulas:

From new to old	From old to new
$x = x' \cos\Theta - y' \sin\Theta$	$x' = x \cos\Theta + y \sin\Theta$
$y = x' \sin\Theta + y' \cos\Theta$	$y' = -x \sin\Theta + \cos\Theta$

Application to SDE:

Let $\mathrm{f}(x, y) = 0$ be an equation. Then $\mathrm{f}(x' \cos\Theta - y' \sin\Theta$