REDUCTION OF GENERAL EQUATION TO STANDARD FORM

In the general form of the equation $ax + by + c = 0$, its –

1. The Slope Intercept Form is

$$y = -\frac{a}{b}x - \frac{c}{b}$$

Here slope$m = -\frac{a}{b}$, Intercept $C = \frac{c}{b}$

2. The Intercept Form is

$$\frac{x}{-\frac{c}{a}} + \frac{y}{-\frac{c}{b}} = 1$$

Here x intercept is $= = -\frac{c}{a}$, y intercept is $= -\frac{c}{b}$

3. The Normal Form is

To transform the general form of a line into the normal form, start by relocating 'c' to the right side of the equation and ensuring it's positive. After that, divide the entire equation by the $\sqrt{a^2 + b^2}$ like so:

$$-\frac{ax}{\sqrt{a^2+b^2}} - \frac{by}{\sqrt{a^2+b^2}} = \frac{c}{\sqrt{a^2+b^2}},$$

$$\cos\alpha = \frac{a}{\sqrt{a^2+b^2}}, \sin\alpha = \frac{b}{\sqrt{a^2+b^2}}$$

$$p = \frac{c}{\sqrt{a^2+b^2}}$$

Ex. Standard forms of a line $3x + 4y = 5$ are

Sol. **1.** Slope intercept form is $y = -\frac{3}{4}x + \frac{5}{4}$

$$m = -\frac{3}{4}, c = \frac{5}{4}$$

2. Intercept form $\frac{x}{\frac{5}{3}} + \frac{y}{\frac{5}{4}} = 1$

$$a = \frac{5}{3}, b = \frac{5}{4}$$

3. Normal form

$$\frac{3x}{\sqrt{3^2+4^2}} + \frac{4y}{\sqrt{3^2+4^2}} = \frac{5}{\sqrt{3^2+4^2}}$$

$$\frac{3x}{5} + \frac{4y}{5} = 1$$

$$p = 1, \alpha = \cos^{-1}\left(\frac{3}{5}\right)$$