3 $x^2+y^2+3xy-11=0$

$x^2+y^2+3xy+3yx-11=0$

$2x+2y\frac{dy}{dx}+3x\frac{dy}{dx}+3y-0=0$

$\frac{dy}{dx}(2y+3x)=-2x-3y$

$\frac{dy}{dx}=\frac{-2x-3y}{2y+3x}$

$m=-\frac{2-3}{2+3}$

$m=-\frac{-8}{8}$

$m=-1$

$x_1=1$ and $y_1=2$

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

$y-2=-1(x-1)$

$y-2=-x+1$

$y=-x+3$ (equation of a tangent)

$y-y_1=\frac{1}{m}(x-x_1)$

$y-2=\frac{-1}{-1}(x-1)$

$y-2=1(x-1)$

$y-2=x-1$

$y=x+1$ (equation of a normal

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Course: Math 102

1. $y = 2 + 3x$

$\frac{dy}{dx} = m = 3$

$m = 3$

$3y = -9 - x$

$y = -\frac{9}{3} - \frac{x}{3}$

$y = -3 - \frac{x}{3}$

$\frac{dy}{dx} = m_2 = 0 - \frac{1}{3}$

$m_2 = -\frac{1}{3}$

The Product = $3 \cdot -\frac{1}{3} = -1$

$\therefore$ The two lines are Perpendicular.

2. $3y - 4 = 2x + 3$

$3y = 2x + 3 + 4$

$3y = 2x + 7$

$y = \frac{2x}{3} + \frac{7}{3}$

$\frac{dy}{dx} = \frac{2}{3}$

$m = \frac{2}{3}$

$y - 5 = x + 6$

$y = x + 6 + 5$

$y = x + 11$

$\frac{dy}{dx} = 1$

Product of the two slopes = $\frac{2}{3} \cdot 1 = \frac{2}{3}$

The two lines are not Perpendicular.