

19/mh801/256

tangent and normal  
at the point  $x=1, y=2$

$$y = 2$$

19/mh801/256

$$7y - 14 - 8 + 8x = 0$$

$$7y + 8x - 22 = 0$$

equation of tangent

$$m_1 m_2 = -1$$

equation of normal

$$\frac{7}{8} \times \frac{8}{7} m_2 = -1$$

$$m_2 = \frac{8}{7}$$

$$\therefore \frac{y - y_1}{x - x_1} = m$$

$$\frac{y - 2}{x - 1} = \frac{8}{7}$$

$$7(y - 2) = 8(x - 1)$$

$$7y - 14 = 8x - 8$$

$$8x - 7y - 8 + 14 = 0$$

$$8x - 7y + 6 = 0$$

19/11/2021

3) Find the equation of the tangent and normal to the curve  $x^2 + y^2 + 3xy - 11 = 0$  at the point  $(2, 1)$

~~$x^2 + y^2$~~  solve

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

$$2x + 2y \frac{dy}{dx} + 3\left(y + x \frac{dy}{dx}\right)$$

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

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

$$\frac{dy}{dx} = \frac{-3y - 2x}{2y + 3x} \quad \text{when } x=2, y=1$$

$$\frac{dy}{dx} = \frac{-3(1) - 2(2)}{2(1) + 3(2)}$$

$$\frac{dy}{dx} = \frac{-6 - 2}{4 + 3}$$

$$\frac{dy}{dx} = \frac{-8}{7}$$

$$\therefore m = \frac{y - y_1}{x - x_1}$$

$$\frac{-8}{7} = \frac{y - 1}{x - 2}$$

$$-8(x - 2) = 7(y - 1)$$

$$-8x + 16 = 7y - 7$$

Name: Ndubuisi Ozioma Laurel  
Matric No: 19/MTH801/256  
Group A

## ASSIGNMENT 1

1)  $y - 3x - 2 = 0$  and  $3y + x + 9 = 0$

Solve

$$y - 3x - 2 = 0$$

$$y = 3x + 2$$

$$3y + x + 9 = 0$$

$$y = -\frac{x}{3} + 6$$

Therefore these are perpendicular because their slopes have negative reciprocals

2)  $3y - 4 = 2x + 3$  and  $y - 5 = x + 6$

$$3y = 2x + 7$$

$$2y = 2x + 7$$

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

$$y = x + 6 + 5$$

$$y = x + 11$$

Therefore they are not perpendicular because their slopes do not have negative reciprocals