

DEPT : MBS

COURSE : MHS

MATA KULIAH : MATH 104

COURSE CODE : MATH 104

Assignment:

1. $y = 2x^2$ at point $(1, 2)$
2. $y = 3x^2 - 2x$ at point $(2, 8)$
3. $y = \frac{x^3}{2}$ at point $(-1, -\frac{1}{2})$
4. $y = 1 + 2x - x^2$ at point $(2, -5)$
5. $y = \frac{1}{3}x$ at point $(3, \frac{1}{3})$

Solution:

1. $y = 2x^2$ at point $(1, 2)$

$$\frac{dy}{dx} = 4x$$

$$m = \frac{dy}{dx}, x = 1$$

$$m = 4x, m = 4(1) = 4$$

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

$$y - 2 = 4(x - 1)$$

$$y - 2 = 4x - 4$$

$$y_1 - 4x = -4 + 2$$

$$y = 4x - 2$$

For normal equation

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

$$y - 2 = \frac{-1}{4} (2x - 1)$$

Cross multiply

$$4y - 8 = -2x + 1$$

$$4y + 2x = 1 + 8$$

$$4y + 2x = 9$$

2. $y = 3x^2 - 2x$ at point $(2, 8)$

$$\frac{dy}{dx} = 6x - 2$$

$$m = \frac{dy}{dx} \quad x = 2$$

$$m = 6(2) - 2, \quad m = 6(2) - 2, \quad m = 10$$

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

$$y - 8 = 10(x - 2)$$

$$y - 8 = 10x - 20$$

$$y - 8 = -20 + 8$$

$$y - 8 = -12$$

For normal equation

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

$$y - 8 = \frac{-1}{10} (2x - 2)$$

cross multiply

$$10y - 80 = x + 2$$

$$10y + x = 2 + 80$$

$$10y + x = 82$$

8. $y = 2$ at points $(-1, -\frac{1}{2})$

$$\frac{dy}{dx} = \frac{3x^2}{0} = \text{indefinite}$$

4. $y = 1 + x - x^2$ at point $(2, 5)$

$$\frac{dy}{dx} = 1 - 2x$$

$$m = 1 - 2(2)$$

$$m = 1 - 4 = -5$$

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

$$y - (-5) = -5(x - 2)$$

$$y + 5 = -5(x + 2) = y + 5 = -5x + 10$$

$$y + 5x = 10 - 5$$

$$y + 5x = 5$$

For a normal equation

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

$$y - (-5) = -\frac{1}{5}(x - 2)$$

$$y + 5 = -\frac{1}{5}(x + 2)$$

Cross multiply

$$5y + 25 = -10x + 2$$

$$5y + 25 = -x - 2$$

$$5y + 20 = -2 - 25$$

$$5y + 20 = -27$$

5. $y = \frac{1}{3}x$ at point $(3, 1/3)$

$$y = x^{-1}$$

$$\frac{dy}{dx} = -x^{-2}$$

$$m = -3^{-2} = -\frac{1}{3^2} \quad m = -\frac{1}{9}$$

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

$$y - \frac{1}{3} = -\frac{1}{9}(x - 3)$$

$$\frac{3y - 1}{3} = -\frac{1}{9}(x - 3)$$

$$27y - 9 = -8x + 9$$

$$27y + 8x = 18$$

For the normal equation

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

$$y - \frac{1}{3} = -1 \div -\frac{1}{9}(x - 3)$$

$$y - \frac{1}{3} = 1 \times \frac{9}{1}(x - 3)$$

$$\frac{y - 1}{3} = 9(x - 3)$$

$$\frac{3y-1}{3} = 9(0c-3)$$

$$\frac{3y-1}{3} = 9x-27$$

$$3y-1 = 27x-81$$

$$3y-27x = -81+1$$

$$3y-27x = -80$$