

Name: Nip Joshua Lubitor

Course: Math 101

Dept: MESS

Matrix no: 17/M1501/288

Assignment

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

$$y = 2x^2$$

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

$$\frac{dy}{dx} \bigg|_{(1, 2)} = 4$$

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

$$m = 4$$

Equation of tangent

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

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

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

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

$$y - 4x = -2$$

$$-4x + y + 2 = 0$$

$$4x - y - 2 = 0$$

b) Equation of normal

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

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

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

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

$$4y + x - 9 = 0$$

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

$$y = 3x^2 - 2$$

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

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

$$6(2) = 12$$

$$m = 12$$

Equation of tangent

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

$$y - 8 = 12(x - 2)$$

$$y - 8 = 12x - 24$$

$$y - 12x = -16$$

$$y - 12x + 16 = 0$$

Equation of normal

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

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

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

$$10y + x - 82 = 0$$

3  $y = x^{3/2}$  at point  $(-1, -1/2)$

$\frac{dy}{dx}$

$$x = x_1$$

$$= 3(-1)^{1/2}$$

$$= 3$$

Equation of tangent

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

$$y - (-1/2) = 3(x - (-1))$$

$$y + 1/2 = 3(x + 1)$$

$$2y + 1 = 3(x + 1)$$

2

$$2y + 1 = 6(x + 1)$$

$$2y + 1 = 6x + 6$$

~~Equation of normal~~  $2y - 6x - 5 = 0$

$$6x - 2y + 5 = 0$$

Equation of normal

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

$$y - (-1/2) = -\frac{1}{3} (x + 1)$$

$$y + 1/2 = -\frac{1}{3} (x + 1)$$

$$2y + 1 = -\frac{1}{3} (x + 1)$$

2

$$6y + 3 = -x - 1$$

$$6y + x + 5 = 0$$

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

$$y = 1 - 2x$$

$\frac{dy}{dx}$

$$x = -2$$

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

$$= 1 - (-4)$$

$$m = 5$$

Equation of Tangent

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

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

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

$$y - 5x - 5 = 0$$

Equation of Normal

$$y - y_1 = -1/m(x - x_1)$$

$$y + 5 = -1/5(x - (-2))$$

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

$$5y + x + 27 = 0$$

5)  $y = 1/x$  at point  $(3, 1/3)$

$$y = -1/x^2$$

$$\frac{dy}{dx} / x = 3$$

$$= -1/3$$

$$m = -1/9$$

Equation of Tangent

$$y - 1/3 = -1/9(x - 3)$$

$$3y - 1 = -1(x - 3)$$

$$3y - 3 = -x + 3$$

$$3y + x - 6 = 0$$

Equation of Normal

$$y - y_1 = 1/m(x - x_1)$$

$$y - 1/3 = 9(x - 3)$$

$$3y - 1 = 27(x - 3)$$

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

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

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

$$3y - 27x + 80 = 0$$