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Course; Maths 104  
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Assignment.

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

$$y = 2x^2$$

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

$$\left. \frac{dy}{dx} \right|_{x=x_1}$$

$$m = 4(1)$$

$$= 4$$

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

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

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

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

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

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

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

Solo

$$y = 6x - 2$$

$$\left. \frac{dy}{dx} \right|_{x=x_1}$$

$$6(2) - 2$$

$$m = 10$$

Equation of tangent

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

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

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

$$y - 10x = -12$$

$$y = 10x - 12$$

$$y - 10x + 12 = 0$$

Equation of normal

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

$$y - 8 = -1/10(x - 2)$$

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

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

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

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

Soln.

$$y = \cancel{3/2}x^{1/2} \quad 3x^2$$

$$\frac{dy}{dx}$$

$$x = x_1 = \cancel{3/2}x^{1/2} \cdot 3(-1^2)$$

$$= -3/2 = -3$$

Equation of tangent

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

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

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

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

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

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

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

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

Equation at normal

b)

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

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

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

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

$$6y + 3 = -2x - 2$$

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

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

Soln

$$y = 1 - 2x$$

$$\frac{dy}{dx} \Big|_{x=-2}$$

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

$$= 1 - (-4)$$

$$m = 5$$

Equation at Tangent

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

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

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

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

Equation of normal

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

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

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

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

6.)  $y = 1/x$  at Point  $(3, 1/3)$

Soln.

$$y = 1/x^2$$

$$dy/dx \Big|_{x=3} = -1/3^3$$

$$m = -1/9$$

Equation of Tangent

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

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

$$9y - 3 = -x + 3$$

$$9y + x - 6 = 0$$

Equation of normal

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

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

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

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

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

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