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Maths 104

$$\textcircled{1} y = 2x^2 \quad (1, 2)$$
$$\frac{dy}{dx} = 4x$$

$$\frac{dy}{dx} = 4(1) = 4$$

$$m = 4$$

eqn of tangent:

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

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

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

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

$$y - 4x = -2$$

$$y - 4x + 2 = 0 \quad (\text{normal})$$

eqn of tangent

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

$$-1/4$$

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

$$4y - 6 = -x + 1$$

$$4y+x = 116$$

$$4y+x-7=0 \text{ (eqn of tangent)}$$

$$\textcircled{2} y = 3x^2 - 2x \text{ (2, 8)}$$

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

$$6(2) - 2 = 10 = m$$

eqn of tangent:

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

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

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

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

$$y - 10x = -12$$

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

$$\text{eqn of tangent} = \frac{-1}{m}$$

$$-1(x - x_1)$$

$$m y - 82 = \frac{-1}{10}(x - 2)$$

$$10y - 80 = -1(x - 2)$$

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

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

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

$$(3) y = x^{3/2}$$

$$C(-1, -1/2)$$

$$y = 2^{-x}$$

$$2x^{-3}$$

$$-6x^{-4}$$

$$= -6(-1) - 4$$

$$m = -6$$

equation of tangent:

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

$$y - (-1/2) = -6(x - (-1))$$

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

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

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

$$y + 6x = -13/2$$

$$y + 6x + 13/2 = 0$$

$$2y + 3x + 13 = 0$$

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

$$y - (-1/2) = \frac{1}{-6}(x - (-1))$$

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

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

$$\textcircled{4} y = 4x - x^2$$

$$(-2, -5)$$

$$-dy/dx = 1 - 2x$$

$$dy/dx = 1 - 2(-2)$$

$$= 1 + 4$$

$$m = 5$$

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

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

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

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

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

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

eqn of tangent normal

$$\frac{1}{m} = \frac{1}{5}$$

$$y - y_1 = \frac{1}{5}(x - x_1)$$

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

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

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

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

$$5y + x + 7 = 0$$

5

$$y = 1/x$$

$$(3, 1/3)$$

$$dy/dx = x^{-1}$$

$$dy/dx = -1x^{-2}$$

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

$$= -\frac{1}{9}$$

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

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

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

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

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

eqn of tangent

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

$$= -1 \div -1/9$$

$$= 9$$

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

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

$$y - 1/3 = 9x - 27$$

$$y - 9x = -27 + 1/3$$

$$y - 9x + 80/3 = 0$$

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

eqn of normal