

## QUIZ 8 SOLUTIONS

$$p) \frac{d}{dx} [x^{-3}] + \frac{d}{dx} [y^{-3}] = \frac{d}{dx} [5]$$

$$-3x^{-4} + \left[-3y^{-4} \frac{dy}{dx}\right] = 0$$

$$-3y^{-4} \frac{dy}{dx} = 3x^{-4}$$

$$\frac{dy}{dx} = \frac{3x^{-4}}{-3y^{-4}} = -\frac{y^4}{x^4}$$

$$q) \frac{d}{dx} \left[ \frac{x-y}{2x+3y} \right] = \frac{d}{dx} [2x]$$

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

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

$$5y - 5x\frac{dy}{dx} = 2(2x+3y)^2$$

$$-5x\frac{dy}{dx} = 2(2x+3y)^2 - 5y$$

$$\frac{dy}{dx} = \frac{2(2x+3y)^2 - 5y}{-5x} = \frac{5y - 2(2x+3y)^2}{5x}$$

$$2. \frac{d}{dx} [(x-y-1)^3] = \frac{d}{dx} [x]$$

$$3(x-y-1)^2 \cdot \frac{d}{dx} [x-y-1] = 1$$

$$3(x-y-1)^2 (1 - \frac{dy}{dx} - 0) = 1$$

$$3(x-y-1)^2 - 3(x-y-1)^2 \frac{dy}{dx} = 1$$

$$-3(x-y-1)^2 \frac{dy}{dx} = 1 - 3(x-y-1)^2$$

$$\frac{dy}{dx} = \frac{1 - 3(x-y-1)^2}{-3(x-y-1)^2}$$

$$\therefore \left. \frac{dy}{dx} \right|_{(1,-1)} = \frac{1 - 3(1 - (-1) - 1)^2}{-3(1 - (-1) - 1)^2} = \frac{1 - 3}{-3} = \frac{2}{3} = m$$

$$y = mx + b$$

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

$$-1 - \frac{2}{3} = b$$

$$-\frac{5}{3} = b$$

$$\therefore \boxed{y = \frac{2}{3}x - \frac{5}{3}}$$