

$$(iii) \quad y = \frac{x(x^2-1)}{x+1}$$

solution

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

x^2-1 is a difference of two squares.

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

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

$$y = x^2 - x$$

$$\begin{aligned} \frac{dy}{dx} &= 2x x^{2-1} - 1 x x^{1-1} \\ &= 2x - x^0 \\ &= 2x - 1 \end{aligned}$$

$$(iv) \quad y = x^{-2}(x-x^3)$$

solution

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

Open the brackets

$$y = x^{-2} \times x - x^{-2} \times x^3$$

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

$$\begin{aligned} \frac{dy}{dx} &= -1 x^{-1-1} - 1 x x^{1-1} \\ &= -x^{-2} - x^0 \\ &= -x^{-2} - 1 \end{aligned}$$

$$(v) y = \sqrt{x} (x^{2/3} - x^{1/2})$$

solution

$$y = \sqrt{x} (x^{2/3} - x^{1/2}) = x^{1/2} (x^{2/3} - x^{1/2})$$

$$y = x^{1/2} \times x^{2/3} - x^{1/2} \times x^{1/2}$$

$$y = x^{7/6} - x^1$$

$$\frac{dy}{dx} = \frac{7}{6} x^{7/6-1} - 1 \times x^{1-1}$$

$$= \frac{7}{6} x^{1/6} - x^0$$

$$= \frac{7}{6} x^{1/6} - 1$$

$$(vi) y = \frac{x^4 - 2x^3 + 3x^2 + 2x - 5}{x^3}$$

solution

$$y = \frac{x^4 - 2x^3 + 3x^2 + 2x - 5}{x^3}$$

$$= \frac{x^4}{x^3} - \frac{2x^3}{x^3} + \frac{3x^2}{x^3} + \frac{2x}{x^3} - \frac{5}{x^3}$$

$$= x - 2 + \frac{3}{x} + \frac{2}{x^2} - \frac{5}{x^3}$$

$$y = x - 2 + 3x^{-1} + 2x^{-2} - 5x^{-3}$$

$$\frac{dy}{dx} = 1 \times x^{1-1} - 0 + -1 \times 3x^{-2-1} + -2 \times 2x^{-2-1} - 3 \times 5x^{-3-1}$$

$$= x^0 - 3x^{-3} - 4x^{-3} + 15x^{-4}$$

$$\frac{dy}{dx} = 1 - 3x^{-3} - 4x^{-3} + 15x^{-4}$$

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

solution

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

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

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

$$y = \frac{x^2 - 5x - 5x + 25}{5x}$$

$$y = \frac{x^2 - 10x + 25}{5x}$$

$$y = \frac{x^2}{5x} - \frac{10x}{5x} + \frac{25}{5x}$$

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

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

$$\frac{dy}{dx} = 1 \times \frac{1}{5}x^{-1} - 0 + -1 \times 5x^{-1-1}$$

$$= \frac{1}{5}x^0 - 5x^{-2}$$

$$= \frac{1}{5} - 5x^{-2}$$

Task

Attempt
Numbers

EX 8.1

2, 3, 4, 5, 6, 7, 8