

Ex 2.4

(Q1) (i) $y = (3x+4)(x-2)$

$$\begin{aligned}\frac{dy}{dx} &= (3x+4)(1) + (x-2)(3) \\ &= 3x+4 + 3x-6 \\ &= 6x-2\end{aligned}$$

(ii) $y = (3x-4)(4x+5)$

$$\begin{aligned}\frac{dy}{dx} &= (3x-4)(4) + (4x+5)(3) \\ &= 12x-16 + 12x+15 \\ &= 24x-1\end{aligned}$$

(iii) $y = (x^2+2)(x-1)$

$$\begin{aligned}\frac{dy}{dx} &= (x^2+2)(1) + (x-1)(2x) \\ &= x^2+2 + 2x^2-2x \\ &= 3x^2-2x+2\end{aligned}$$

(iv) $y = (2x-1)(x^2-2)$

$$\begin{aligned}\frac{dy}{dx} &= (2x-1)(2x) + (x^2-2)(2) \\ &= 4x^2-2x+2x^2-4 \\ &= 6x^2-2x-4\end{aligned}$$

(v) $y = (1-x)(2-x^2)$

$$\begin{aligned}\frac{dy}{dx} &= (1-x)(-2x) + (2-x^2)(-1) \\ &= -2x+2x^2-2+x^2 \\ &= 3x^2-2x-2\end{aligned}$$

(vi) $y = (x^3-1)(2x+1)$

$$\begin{aligned}\frac{dy}{dx} &= (x^3-1)(2) + (2x+1)(3x^2) \\ &= 2x^3-2+6x^3+3x^2 \\ &= 8x^3+3x^2-2\end{aligned}$$

(Q4) $y = \sqrt{x}(2x-1)$

$$\begin{aligned}y &= (x^{\frac{1}{2}})(2x-1) \\ \frac{dy}{dx} &= x^{\frac{1}{2}}(2) + (2x-1)\left(\frac{1}{2}x^{-\frac{1}{2}}\right) \\ &= 2x^{\frac{1}{2}}+x^{\frac{1}{2}}-\frac{1}{2}x^{-\frac{1}{2}} \\ &= 3x^{\frac{1}{2}}-\frac{1}{2}x^{-\frac{1}{2}} \\ &= 3\sqrt{x}-\frac{1}{2\sqrt{x}} \\ &= \frac{6x-1}{2\sqrt{x}}\end{aligned}$$

(Q5) $y = (\sqrt{x}+4)(\sqrt{x}-4)$

$$\begin{aligned}\frac{dy}{dx} &= (\sqrt{x}+4)\left(\frac{1}{2}x^{-\frac{1}{2}}\right) + (\sqrt{x}-4)\left(\frac{1}{2}x^{-\frac{1}{2}}\right) \\ &= (\sqrt{x}+4)\left(\frac{1}{2\sqrt{x}}\right) + (\sqrt{x}-4)\left(\frac{1}{2\sqrt{x}}\right) \\ &= \frac{1}{2}+\frac{4}{2\sqrt{x}}+\frac{1}{2}-\frac{4}{2\sqrt{x}} \\ &= \frac{1}{2}+\frac{1}{2} \\ &= 1\end{aligned}$$