

Question 05.

Differentiate the following functions with respect to x

(a) $x^3 + 5x^2 - 2$ (b) $x \sin x$ (c) $(2x + 3)^6$ (d) $\frac{x}{\sin x}$ (e) $e^{(5x+2)}$

Solution (a) $\frac{d}{dx}(x^3 + 5x^2 - 2) = \frac{d}{dx}(x^3) + 5 \frac{d}{dx}(x^2) - \frac{d}{dx}(2)$
 $= 3x^2 + 5(2x) - 0$
 $= 3x^2 + 10x$

(b) $\frac{d}{dx}(x \sin x) = x \frac{d}{dx}(\sin x) + \sin x \cdot \frac{d}{dx}(x)$
 $= x \cos x + \sin x (1)$
 $= x \cos x + \sin x$

(c) $\frac{d}{dx}(2x + 3)^6 = 2 \frac{d}{dX}(X)^6$, where $X = 2x + 3$
 $= 2\{6X^5\} = 12X^5 = 12(2x + 3)^5$