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COURSE: MAT-115 - Differential Calculus &  
Coordinate Geometry

Ans to the Q No 1

$$\textcircled{1} \lim_{x \rightarrow 0} \frac{\sqrt{1+x}-1}{x}$$

$$= \lim_{x \rightarrow 0} \frac{1}{2\sqrt{1+x}} \quad \text{[L'Hospital rule]}$$

$$= \lim_{x \rightarrow 0} \frac{1}{2\sqrt{1+x}}$$

$$= \frac{1}{2\sqrt{1+0}} \text{ Ans.}$$

Ans. to the Q. No. 2

$$f(x) = x^3 + 5x^2$$

$$\therefore \frac{d}{dx} [f(x)] = \frac{d}{dx} (x^3 + 5x^2)$$

$$= 3x^2 + 5 \cdot 2x$$

$$= 3x^2 + 10x \text{ Ans.}$$

Ans to the Q no 3

$$\begin{aligned} \textcircled{3} \int (2e^x + \frac{6}{x} + \ln 2) dx \\ = 2e^x + 6 \cdot \ln|x| + x \ln 2 + \text{Ans.} \end{aligned}$$

Ans to the Q no-4

$$\begin{aligned} f(x) &= x^2 \sin x \\ \therefore f'(x) &= \frac{d}{dx} [x^2 \sin x] \\ &= x^2 \frac{d}{dx} (\sin x) + \sin x \frac{d}{dx} (x^2) \\ &= x^2 \cos x + \sin x \cdot 2x \\ &= x(x \cos x + 2 \sin x) \text{ Ans.} \end{aligned}$$