

SET-K

Ans To The Ques No.01

b

$$\lim_{x \rightarrow 9} \frac{3x-27}{\sqrt{x}-3}$$

$$= \lim_{x \rightarrow 9} \frac{(3x-27)}{(\sqrt{x}-3)} \cdot \frac{(\sqrt{x}+3)}{(\sqrt{x}+3)}$$

$$= \lim_{x \rightarrow 9} \frac{3(x-9)}{(\sqrt{x}-3)} \cdot \frac{(\sqrt{x}+3)}{(\sqrt{x}+3)}$$

$$= \lim_{x \rightarrow 9} \frac{3(x-9)}{(x-9)} \cdot \frac{(\sqrt{x}+3)}{(\sqrt{x}+3)}$$

$$= \lim_{x \rightarrow 9} 3(\sqrt{x}+3)$$

$$= 3(\sqrt{9}+3)$$

$$= 3(3+3)$$

$$= 3 \times 6$$

$$= 18 \quad (\text{Ans})$$

Ans To The Ques No. 02

$$\begin{aligned}2. \quad & \lim_{x \rightarrow 9} \frac{x-9}{\sqrt{x}-3} \\&= \lim_{x \rightarrow 9} \frac{(x-9)(\sqrt{x}+3)}{(\sqrt{x}-3)(\sqrt{x}+3)} \\&= \lim_{x \rightarrow 9} \frac{(x-9)(\sqrt{x}+3)}{(x-9)} \\&= \lim_{x \rightarrow 9} (\sqrt{x}+3) \\&= \sqrt{9}+3 \\&= 3+3 \\&= 6 \quad (\text{Ans})\end{aligned}$$

Ans To The Ques No:03

$$\lim_{t \rightarrow 1} \frac{t^3 + t^2 - 5t + 3}{t^3 - 3t + 2}$$

$$= \lim_{t \rightarrow 1} \left(\frac{t^3 - t^2 + 2t^2 - 2t - 3t + 3}{t^3 - 4t + t + 2} \right)$$

$$= \lim_{t \rightarrow 1} \frac{t^2(t-1) + 2t(t-1) - 3(t-1)}{t(t^2-4) + t + 2}$$

$$= \lim_{t \rightarrow 1} \frac{(t-1)(t^2+2t-3)}{t(t-2) \times (t+2) + t + 2}$$

$$= \lim_{t \rightarrow 1} \frac{(t-1)(t^2+2t-3)}{(t+2)(t^2-2t+1)}$$

$$= \lim_{t \rightarrow 1} \frac{(t-1)(t^2+2t-3)}{(t+2)(t-1)^2}$$

$$= \lim_{t \rightarrow 1} \frac{t^2+2t-3}{(t^2+2)(t-1)}$$

$$= \lim_{t \rightarrow 1} \frac{t^2+3t-t-3}{(t+2)(t-1)}$$

$$= \lim_{t \rightarrow 1} \frac{t(t+3)-1(t+3)}{(t+2)(t-1)}$$

$$= \lim_{t \rightarrow 1} \frac{(t+3)(t-1)}{(t+2)(t-1)}$$

$$= \lim_{t \rightarrow 1} \frac{(t+3)}{(t+2)}$$

$$= \frac{1+3}{1+2}$$

$$= \frac{4}{3}$$

Ans To The Ques No. 04

$$\lim_{x \rightarrow \infty} \frac{1-e^x}{1+2e^x}$$

$$= \lim_{t \rightarrow \infty} \frac{1-t}{1+2t}$$

$$= \lim_{t \rightarrow \infty} \frac{t(\frac{1}{t}-1)}{t(\frac{1}{t}+2)}$$

$$= \lim_{t \rightarrow \infty} \frac{\left(\frac{1}{t}-1\right)}{\left(\frac{1}{t}+2\right)}$$

$$= \frac{\frac{1}{\infty}-1}{\frac{1}{\infty}+2} = -\frac{1}{2} \quad (\text{Ans})$$

$$\begin{aligned} &\text{Let,} \\ &e^x = t \end{aligned}$$

$$\begin{aligned} &x \rightarrow \infty \text{ then,} \\ &t \rightarrow e^{\infty} \rightarrow \infty \\ &\therefore t \rightarrow \infty \end{aligned}$$

Ans To The Ques Ans. 05

$$\begin{aligned}5. \quad & \lim_{x \rightarrow 1} \frac{x^4 - 1}{x - 1} \\&= \lim_{x \rightarrow 1} \frac{(x^2 - 1)(x^2 + 1)}{(x - 1)} \\&= \lim_{x \rightarrow 1} \frac{(x - 1)(x + 1)(x^2 + 1)}{(x - 1)} \\&= \lim_{x \rightarrow 1} (x + 1)(x^2 + 1) \\&= \lim_{x \rightarrow 1} (x^3 + x^2 + x + 1) \\&= 1^3 + 1 + 1^2 + 1 \\&= 4 \quad (\text{Ans})\end{aligned}$$