

Topic :-LIMITS AND DERIVATIVES

- $\lim_{\theta \rightarrow \frac{\pi}{2}} \frac{\frac{\pi}{2} - \theta}{\cot \theta}$ is equal to
a) 0 b) -1 c) 1 d) ∞
- $\lim_{x \rightarrow 0} \frac{a^x - b^x}{e^x - 1}$ is equal to
a) $\log_e \left(\frac{a}{b}\right)$ b) $\log_e \left(\frac{b}{a}\right)$ c) $\log_e(ab)$ d) $\log_e(a + b)$
- $\lim_{x \rightarrow -\infty} \frac{2x - 1}{\sqrt{x^2 + 2x + 1}}$ is equal to
a) 2 b) -2 c) 1 d) -1
- $\lim_{x \rightarrow 2} \frac{\sqrt{1 + \sqrt{2 + x}} - \sqrt{3}}{x - 2}$ is equal to
a) $\frac{1}{8\sqrt{3}}$ b) $\frac{1}{\sqrt{3}}$ c) $8\sqrt{3}$ d) $\sqrt{3}$
- $\lim_{x \rightarrow 0} \left\{ \frac{1}{x^3 \sqrt{8 + x}} - \frac{1}{2x} \right\}$ is equal to
a) $\frac{1}{12}$ b) $\frac{-4}{3}$ c) $\frac{-16}{3}$ d) $\frac{-1}{48}$
- The value of $\lim_{x \rightarrow 0} \frac{a^x - b^x}{x}$, is
a) $\log \left(\frac{a}{b}\right)$ b) $\log \left(\frac{b}{a}\right)$ c) $\log(ab)$ d) $-\log(ab)$
- $\lim_{x \rightarrow 1} \frac{\sum_{r=1}^n x^r - n}{x - 1}$ is equal to
a) $\frac{n}{x}$ b) $\frac{n(n + 1)}{2}$ c) 1 d) 0
- The value of $\lim_{x \rightarrow 1} (\log_5 5x)^{\log_x 5}$ is
a) 1 b) e c) -1 d) None of these
- $\lim_{x \rightarrow 0} \frac{e^{\tan x} - e^x}{\tan x - x} =$
a) 1 b) e c) $e - 1$ d) 0

10. The value of $\lim_{x \rightarrow \infty} \left(\frac{x^2 - 2x + 1}{x^2 - 4x + 2} \right)^x$, is
 a) e^2 b) e^{-2} c) e^6 d) None of these
11. If $\lim_{x \rightarrow 0} \frac{\log(x+a) - \log a}{x} + k \lim_{x \rightarrow e} \frac{\log x - 1}{x-e} = 1$, then the value of k is
 a) $1 - \frac{1}{a}$ b) $e(1-a)$ c) $e\left(1 - \frac{1}{a}\right)$ d) $e(1+a)$
12. The value of $\lim_{x \rightarrow \infty} \frac{\sin x}{x}$, is
 a) 1 b) 0 c) -1 d) None of these
13. $\lim_{x \rightarrow 0} x \log \sin x$ is equal to
 a) 0 b) ∞
 c) 1 d) Cannot be determined
14. $\lim_{x \rightarrow 0} \frac{d}{dx} \int \frac{1 - \cos x}{x^2} dx$ is equal to
 a) 1 b) 0 c) 1/2 d) None of these
15. $\lim_{x \rightarrow 0} \frac{1}{x} \left\{ \int_y^a e^{\sin^2 t} dt - \int_{x+y}^a e^{\sin^2 t} dt \right\}$ is equal to (where a is a constant)
 a) $e^{\sin^2 y}$ b) $\sin 2y e^{\sin^2 y}$ c) 0 d) None of these
16. Let $f''(x)$ be continuous at $x = 0$ and $f''(0) = 4$. Then $\lim_{x \rightarrow 0} \frac{2f(x) - 3f(2x) + f(4x)}{x^2}$ is equal to
 a) 11 b) 2 c) 12 d) None of these
17. If $\lim_{x \rightarrow 0} \frac{[(a-n)x - \tan x] \sin nx}{x^2} = 0$, where n is non-zero real number, then a is equal to
 a) 0 b) $\frac{n+1}{n}$ c) n d) $n + \frac{1}{n}$
18. The values of a and b such that $\lim_{x \rightarrow 0} \frac{x(1 + a \cos x) - b \sin x}{x^3} = 0$, are
 a) $\frac{5}{2}, \frac{3}{2}$ b) $\frac{5}{2}, -\frac{3}{2}$ c) $-\frac{5}{2}, -\frac{3}{2}$ d) None of these
19. The value of $\lim_{x \rightarrow \infty} \left(\frac{x^2 - 2x + 1}{x^2 - 4x + 2} \right)^x$ is
 a) e^2 b) e^{-2} c) e^6 d) None of these
20. The value of $\lim_{x \rightarrow 0} \frac{(1 - \cos 2x)}{x^2}$ is
 a) Does not exist b) Infinite c) 0 d) 2