

Class: XI
Subject: Maths
Topic: Limits and Derivatives
No. of Questions: 25

1. The notation ' $x \rightarrow 2^-$ ' denotes which of the following options?
- A. x approaches to 2 from its left hand side.
 - B. x approaches to 2 from its right hand side.
 - C. x does not approach to 2.
 - D. none of these
2. Which of the following indeterminate form is the most fundamental one?

- A. $\frac{\infty}{\infty}$
- B. $0 \times \infty$
- C. $\infty - \infty$
- D. $\frac{0}{0}$

3. $\lim_{x \rightarrow a} \left\{ \frac{x^{45} - a^{45}}{x - a} \right\}$ is equal to

- A. $45a$
- B. $45a^{44}$
- C. $45a^{45}$
- D. $44a^{45}$

4. $\lim_{x \rightarrow 0} \left(\frac{e^{4x} - 1}{x} \right)$ is equal to

- A. $4x$
- B. 4
- C. 3
- D. $\frac{4}{x}$

5. $\lim_{x \rightarrow 0} \left(\frac{4^x - 2^x}{x} \right)$ is equal to

- A. $\log 4$
- B. $\log 4^x$
- C. $\log 2^x$
- D. $\log 2$

6. $\lim_{x \rightarrow 0} \frac{\tan 3x}{\sin 5x}$ is equal to

- A. $\frac{3}{5}$
- B. $\frac{5}{3}$
- C. 3
- D. 1

7. $\lim_{x \rightarrow 0} \left(\frac{\sin x - \sin x \cos x}{x^3 \cos x} \right)$ is equal to

- (A) $\frac{1}{2}$
- (B) $\frac{2}{3}$
- (C) $\frac{3}{2}$
- (D) $\frac{1}{4}$

8. What will be the value of 'k' if $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1} = \lim_{x \rightarrow k} \frac{x^4 - k^4}{x^3 - k^3}$?

- A. $\frac{3}{2}$
- B. $\frac{9}{4}$
- C. $\frac{4}{3}$
- D. 3

9. $\lim_{x \rightarrow 0} \frac{(a^x + b^x + c^x + d^x)}{4}$ is equal to

- A. $(abcd)^{1/4}$
- B. $\frac{abcd}{4}$
- C. e^{abcd}
- D. $\log(abcd)^{1/4}$

10. $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\cot x - \cos x}{(\pi - 2x)^3}$ is equal to

- A. $\frac{1}{16}$
- B. $\frac{1}{8}$
- C. $\frac{2}{3}$
- D. $\frac{1}{4}$

11. If $y = \cos^2 x$, then $\frac{dy}{dx}$ is equal to
- A. $\sin 2x$
 - B. $2 \sin x$
 - C. $\sin^2 x$
 - D. $-\sin 2x$
12. If $y = \cos(x^2 + 1)$, then dy/dx is equal to
- A. $\sin(x^2 + 1)$
 - B. $2x \sin(x^2 + 1)$
 - C. $\sin(x^2 + 1)$
 - D. $\sin 2x$
13. Find the derivative of $\tan x^2$.
- A. $\sec x^2$
 - B. $\sec 2x$
 - C. $2x \sec^2 x^2$
 - D. $2 \sec^2 x^2$
14. Find the derivative of $e^{\sqrt{x}}$.
- A. $e^{\sqrt{x}}$
 - B. $\frac{1}{2} e^{\sqrt{x}}$
 - C. $\frac{e^{\sqrt{x}}}{\sqrt{x}}$
 - D. $\frac{e^{\sqrt{x}}}{2\sqrt{x}}$

15. If $y = \sqrt{\sin 3x}$, then $\frac{dy}{dx}$ is equal to

- A. $\frac{\sqrt{\cos 3x}}{3}$
- B. $\frac{3}{2} \cos \sqrt{\sin 3x}$
- C. $\frac{2\sqrt{\sin 3x}}{3 \cos 3x}$
- D. $\frac{2\sqrt{\sin 3x}}{\sqrt{\sin 3x}} \cdot \cos x$

16. Find the derivative of $x e^x$.

- A. $(x + 1) e^x$
- B. e^x
- C. $x + e^x$
- D. $x + 1$

17. If $y = \frac{x}{\sqrt{1-x^2}}$, find $\frac{dy}{dx}$.

- A. $\frac{1}{(1-x^2)^{\frac{3}{2}}}$
- B. $\frac{1}{(1-x^2)^{\frac{1}{2}}}$
- C. $\sqrt{1-x^2}$
- D. $(1-x^2)^{\frac{3}{2}}$

18. If $y = \sqrt[3]{\frac{1 - \tan x}{1 + \tan x}}$, find $\frac{dy}{dx}$.

A. $\frac{-\sec^2 x}{(1 + \tan x)^{\frac{2}{3}}(1 - \tan x)^{\frac{1}{3}}}$

B. $\frac{\sec^2 x}{(1 + \tan x)^{\frac{2}{3}}(1 - \tan x)^{\frac{1}{3}}}$

C. $\frac{-\sec^2 x}{(1 + \tan x)^{\frac{2}{3}}}$

D. $\frac{-\sec^2 x}{(1 - \tan x)^{\frac{2}{3}}(1 + \tan x)^{\frac{1}{3}}}$

19. If $y = \cos^2 x^2$, then find $\frac{dy}{dx}$.

A. $2x \sin (2x^2)$

B. $\sin (2x^2)$

C. $x \sin (2x^2)$

D. $2x \cos (2x^2)$

20. Find the derivative of $\left(\frac{\sin x + \tan x}{\sin x - \tan x}\right)$.

A. $\frac{-2}{(1 - \sin 2x)}$

B. $\frac{2}{1 - \sin 2x}$

C. $\frac{1 + \sin x}{-2}$

D. $\frac{-2}{1 + \sin x}$

21. Evaluate $\lim_{x \rightarrow \frac{\pi}{2}} \frac{1 + \cos 2x}{(\pi - 2x)^2}$

22. Differentiate the function $y = \frac{(x+2)(3x-1)}{(2x+5)}$ with respect to x

23. Find $\lim_{x \rightarrow 5} |x| - 5$

24. Find $\lim_{x \rightarrow 0} f(x)$ and $\lim_{x \rightarrow 1} f(x)$ where $f(x) = \begin{cases} 2x+3; x \leq 0 \\ 3(x+1); (x > 0) \end{cases}$

25. Find derivative of $\sec x$ by first principle

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