Limits

Subjects : Maths **Practice Questions and PYQs**

Maths - Section A (MCQ)

1. The $\lim_{x\to\infty}\left(\frac{3x-1}{3x+1}\right)^{4x}$ equals

   A) 1 **B)** 0 **C)** $e^{-8/3}$ **D)** $e^{-4/9}$

2. $\lim_{x\to\infty}\left(\frac{x^2+1}{x+1}-ax-b\right),(a,b\in R)=0$. Then

   A) $a=0,b=1$ **B)** $a=1,b=-1$ **C)** $a=-1,b-1$ **D)** $a=0,b=0$

3. $\lim\limits_{x\to\frac{\pi}{4}}\dfrac{\sec^2 x-2}{\tan x-1}=$

   A) 1 **B)** $\sqrt{2}$ **C)** $\dfrac{1}{\sqrt{2}}$ **D)** 2

4. If $\lim_{x\to1}\dfrac{x^4-1}{x-1}=\lim_{x\to k}\dfrac{x^3-k^3}{x^2-k^2}$, then the value of K is

   A) 8 **B)** $\dfrac{8}{3}$ **C)** $\dfrac{4}{3}$ **D)** $\dfrac{3}{4}$

5. The value of $\lim\limits_{x\to0}\dfrac{\sin(a+x)-\sin(a-x)}{x}$ is

   A) 1 **B)** $2\cos a$ **C)** 0 **D)** $2\sin a$

6. $\lim\limits_{x\to0}\left(\dfrac{\sin ax}{\sin bx}\right)^k$ equals

   A) $\dfrac{b}{a}$ **B)** $\left(\dfrac{b}{a}\right)^k$ **C)** $\left(\dfrac{a}{b}\right)^k$ **D)** $\dfrac{a}{b}$

7. The value of $\lim_{x\to0}\left(\frac{2+x}{2-x}\right)^{\frac{1}{x}}$ is

   A) e **B)** e^2 **C)** e^-2 **D)** $e^{\frac{-1}{2}}$

8. The value of $\lim_{x\to0}\frac{\sin 3x+e^{2x}-1}{x}$ is equal to

   A) 2 **B)** 3 **C)** 5 **D)** 1

9. The value of $\lim_{x\to\infty}\left(\frac{x^2-2x+1}{x^2-4x+2}\right)^{2x}$ is

   A) e^2 **B)** e^4 **C)** e **D)** e^{16}

10. The value of $\lim_{x\to0}\left(\dfrac{a^x+b^x+c^x}{3}\right)^{2/x},(a,b,c>0)$ is

    A) $(abc)^3$ **B)** abc **C)** $(abc)^{1/3}$ **D)** None of these

11. $\lim_{x\to0}\frac{xa^x-x}{1-\cos x}$ is equal to

    A) $\log a$ **B)** $\frac{l}{2}\log a$ **C)** $2\log a$ **D)** $2\log 2$

12. $\lim\limits_{x\to 0}\dfrac{(1-\cos 2x)(3+\cos x)}{x\tan 4x}$ is equal to:

A) 1 **B)** 4 **C)** 2 **D)** 3

13. The value of $\lim_{x\to 0}\frac{\int_0^{x^2}\sec^2 t\,dt}{x\sin x}$ is

A) 3 **B)** 2 **C)** 1 **D)** -1

14. $\lim_{x\to 2}\frac{x^2+2^{2-x}-5}{2^{-x/2}-2^{1-x}}$ is equal to _____

A) 12 **B)** 14 **C)** 15 **D)** 10

15. $\lim_{x\to 0}\frac{\sin 3x-\sin x}{\sin x}$ is

A) -2 **B)** 2 **C)** 0 **D)** None of these

16. $\lim_{x\to 0}\frac{1-\cos mx}{1-\cos nx}$ is equal to

A) $\frac{m}{n}$ **B)** $\frac{m^2}{n^2}$ **C)** 0 **D)** $\frac{n^2}{m^2}$

17. $\lim_{n\to\infty}\left[\frac{1}{n+1}+\frac{1}{n+2}+\ldots+\frac{1}{6n}\right]$

A) $\log 2$ **B)** $\log(1+\sqrt{5})$ **C)** $\log 6$ **D)** 0

18. The value of $\lim_{x\to\pi/6}\frac{2\sin^2 x+\sin x-1}{2\sin^2 x-3\sin x+1}$ is

A) 3 **B)** -3 **C)** 6 **D)** 0

19. $\lim_{x\to 0}\frac{e^{\sin x}-1}{x}$ is equal to

A) 0 **B)** e **C)** 1 **D)** Does not exist

20. If $\lim_{x\to 0}\frac{\sin(2+x)-\sin(2-x)}{x}=A\cos B$, then the values of A and B respectively are

A) 1,2 **B)** 2,1 **C)** 1,1 **D)** 2,2

21. If $f(x)=\begin{vmatrix}\cos x & 1 & 0\\ 0 & 2\cos x & 3\\ 0 & 1 & 2\cos x\end{vmatrix}$, then $\lim_{x\to\pi} f(x)$ is equal to

A) -1 **B)** 1 **C)** 0 **D)** 3

22. $\lim_{x\to a}\left[\frac{\sqrt{a+2x}-\sqrt{3x}}{\sqrt{3a+x}-2\sqrt{x}}\right]$ is equal to

A) $\frac{2}{3}$ **B)** $\frac{2}{\sqrt{3}}$ **C)** $\frac{3\sqrt{3}}{2}$ **D)** $\frac{2}{3\sqrt{3}}$

23. $\lim_{n\to\infty}\left(\frac{n}{n^2+1^2}+\frac{n}{n^2+2^2}+\frac{n}{n^2+3^2}+\ldots+\frac{1}{5n}\right)=$

A) $\pi/4$ **B)** $\tan^{-1}3$ **C)** $\tan^{-1}2$ **D)** $\pi/2$

24. If a function f is defined by $f(x)=\frac{\cot^3 x-\tan x}{\cos(x+\pi/4)}(x\neq\pi/4)$, then $\lim_{x\to\frac{\pi}{4}} f(x)=$

A) 4 **B)** 8 **C)** $\frac{8}{3}$ **D)** 16

25. $\lim_{x\to 1}\frac{(2x-3)(\sqrt{x}-1)}{2x^2+x-3}=$

A) $\frac{1}{10}$ **B)** $-\frac{1}{10}$ **C)** $\frac{2}{5}$ **D)** $-\frac{2}{5}$

26. If $f(9)=9$ and $f'(9)=4$, then $\lim_{x\to 9}\frac{\sqrt{f(x)}-3}{\sqrt{x}-3}=$

A) 3 **B)** 4 **C)** 6 **D)** 9

27. What is $\lim_{x\to 0}\frac{3^x+3^{-x}-2}{x}$ equal to?

A) 0 **B)** -1 **C)** 1 **D)** Limit does not exist

28. If $\lim_{x\to 0}\frac{\cos 2x-\cos 4x}{1-\cos 2x}=k$, then $\lim_{x\to k}\frac{x^k-27}{x^{k+1}-81}=$

A) 0 **B)** 1 **C)** $\frac{1}{2}$ **D)** $\frac{1}{4}$

29. $\lim_{x\to\infty}\frac{(3-x)^{25}(6+x)^{35}}{(12+x)^{38}(9-x)^{22}}=$

A) 3^{60} **B)** -1 **C)** 1 **D)** 0

30. $\lim_{x\to\frac{\pi}{4}}\frac{2\sqrt{2}-(\cos x+\sin x)^3}{1-\sin 2x}=$

A) $\frac{1}{\sqrt{2}}$ **B)** $\frac{3}{2}$ **C)** $\frac{3}{\sqrt{2}}$ **D)** $\frac{\sqrt{3}}{2}$

31. $\lim_{x\to 0}\frac{1-\cos x\cos 2x}{\sin^2 x}=$

A) $\frac{11}{4}$ **B)** $\frac{5}{2}$ **C)** 3 **D)** 5

32. $\lim_{x\to 0}\left(\frac{\sin(\pi\cos^2 x)}{x^2}\right)=$

A) $-\pi$ **B)** π **C)** $\frac{\pi}{2}$ **D)** 1

33. $\lim_{x\to 1}\left(\frac{x+x^2+x^3+\ldots+x^n-n}{x-1}\right)=$

A) $\frac{n(n+1)}{2}$ **B)** $\frac{n+1}{2}$ **C)** $\frac{2}{n}$ **D)** n

34. $\lim_{x\to 0}\frac{\cos 2x-\cos 3x}{\cos 4x-\cos 5x}=$

A) $\frac{5}{9}$ **B)** 1 **C)** $\frac{3}{4}$ **D)** $\frac{2}{5}$

35. $\lim_{x\to 2}\frac{3^x+3^{3-x}-12}{3^{3-x}-3^{\frac{x}{2}}}=$

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

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Subjects : Maths **Practice Questions and PYQs**

Maths - Section A (MCQ)

1 - C	2 - B	3 - D	4 - B	5 - B	6 - C	7 - A	8 - C	9 - B	10 - D
11 - C	12 - C	13 - C	14 - A	15 - B	16 - B	17 - C	18 - B	19 - C	20 - D
21 - A	22 - D	23 - C	24 - B	25 - B	26 - B	27 - A	28 - D	29 - B	30 - C
31 - B	32 - B	33 - A	34 - A	35 - A					