

Select the letter of the best choice. If the answer is not there, choosed E) NOTA.

1.  $\lim_{x \rightarrow \infty} \frac{\sqrt{x^4 + x^3 + x^2 + x}}{x^2 + x}$

- A) 1                      B) 0                      C)  $\infty$                       D)  $\frac{1}{2}$

2.  $\lim_{x \rightarrow 2} \frac{x^3 + 4x^2 - 7x - 10}{|x - 2|}$

- A) 21                      B) 0                      C) -21                      D) does not exist

3.  $\lim_{x \rightarrow 0} \frac{e^x - 1}{\sin x}$

- A) 1                      B) 0                      C)  $\infty$                       D) does not exist

4.  $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sec^2 x - 2 \tan x}{1 + \cos 4x}$

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

5. Given  $f(x) = x^2 - 3x$ , find  $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$

- A)  $2x - 3$                       B)  $2x + h - 3$                       C)  $h - 3$                       D) 0

6.  $\lim_{x \rightarrow 0} \frac{e^x + e^{-x} - x^2 - 2}{\sin^2 x - x^2}$

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

7.  $\lim_{x \rightarrow 0^+} x^x$

- A) 0                      B) 1                      C)  $e$                       D)  $\infty$

8.  $\lim_{x \rightarrow 0^+} (x \ln x)$

- A)  $-\infty$                       B)  $\infty$                       C) 0                      D) 1

Limits

9.  $\lim_{x \rightarrow \frac{1}{\sqrt{3}}} [x^2]$   
 A)  $\frac{1}{3}$                       B) 0                      C) 1                      D) does not exist
10.  $\lim_{x \rightarrow \infty} x \sin \frac{\pi}{2x}$   
 A)  $\frac{\pi}{2}$                       B) 1                      C) 0                      D)  $\frac{2}{\pi}$
11.  $\lim_{x \rightarrow 0} (3^{-\frac{1}{x^2}} + 1)$   
 A)  $\infty$                       B) 2                      C) 0                      D) 1
12.  $\lim_{x \rightarrow 0} \sum_{i=0}^{\infty} \frac{x^2}{(1+x^2)^i}$   
 A) 1                      B) 0                      C) -1                      D) 2
13.  $\lim_{x \rightarrow \infty} \frac{x + \cos x}{x + \sin x}$   
 A)  $-\infty$                       B)  $\infty$                       C) 0                      D) 1
14.  $\lim_{x \rightarrow 0^+} \frac{\ln x}{\cot x}$   
 A)  $\infty$                       B) does not exist                      C) 0                      D) 1
15.  $\lim_{x \rightarrow 0^+} \frac{\int_0^x \sin t^3 dx}{x^4}$   
 A)  $\frac{1}{4}$                       B)  $\frac{1}{2}$                       C) 1                      D) does not exist
16.  $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x}\right)^x$ ,  $x > 1$ ,  $x \in \text{Integers}$   
 A)  $\infty$                       B) 1                      C) 0                      D)  $e$
17.  $\lim_{x \rightarrow -3} \frac{x^2 + 2x - 8}{x^2 + x - 6}$   
 A) -5                      B)  $\frac{4}{5}$                       C)  $\infty$                       D) does not exist

Limits

18.  $\lim_{x \rightarrow 0^+} \frac{3}{1 + e^{-1/x}}$   
 A) 0                      B) 3                      C)  $\infty$                       D) does not exist
19.  $\lim_{x \rightarrow 0} (\cos x)^{1/x^2}$   
 A)  $-\frac{1}{2}$                       B) 1                      C)  $e^{1/2}$                       D) does not exist
20.  $\lim_{x \rightarrow 0} \left( \frac{1}{\sin^2 x} - \frac{1}{x^2} \right)$   
 A) 0                      B)  $\frac{1}{60}$                       C)  $\frac{1}{3}$                       D)  $\frac{1}{2}$
21.  $\lim_{h \rightarrow 0} \frac{\sqrt{(x+h)^3} - \sqrt{x^3}}{h}$   
 A)  $\frac{3\sqrt{x}}{2}$                       B)  $\infty$                       C)  $\sqrt{h}$                       D) 0
22.  $\lim_{x \rightarrow 3} \frac{2x^3 - 54}{9x^2 - 81}$   
 A) 0                      B) 1/3                      C) 2/3                      D) 1
23.  $\lim_{x \rightarrow \infty} \frac{x^{1994}}{e^x}$   
 A) 0                      B) 1                      C) 1994                      D)  $\infty$
24.  $\lim_{x \rightarrow 0} \frac{\csc x}{\csc 2x}$   
 A) 0                      B) 1/2                      C) 1                      D) 2
25.  $\lim_{x \rightarrow 0^+} \frac{1 + 2^{1/x}}{3 + 4^{1/x}}$   
 A) 0                      B)  $\frac{1}{2}$                       C)  $\frac{1}{3}$                       D)  $\frac{1}{\ln 2}$
26.  $\lim_{r \rightarrow 0} \left[ \frac{1}{2} r^{-1} ((r+e)^{r+e}) - e^e \right]$   
 A)  $e$                       B)  $\frac{1}{2} e^e$                       C)  $e^e$                       D)  $2e^e$

Limits

27.  $\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sin x}{x}$

- A) 0                      B)  $\frac{2}{\pi}$                       C) 1                      D)  $\frac{\pi}{2}$

28.  $\lim_{x \rightarrow 2} \frac{\sqrt{8-x^2} - x}{x-2}$

- A) 2                      B) 0                      C)  $\frac{1}{2}$                       D)  $\infty$

29.  $\lim_{x \rightarrow 0} \frac{e^x - \ln(1+x) - 1}{x^2}$

- A) -1                      B) 0                      C)  $\frac{1}{2}$                       D)  $\infty$

30.  $\lim_{x \rightarrow 0} \frac{5x}{(\ln 5)^{5^x} - (\ln 5)e^x}$

- A) 0                      B) 5                      C)  $\frac{5}{\ln 5}$                       D)  $\frac{5}{\ln 5(\ln 5 - 1)}$

31.  $\lim_{x \rightarrow 0^+} \left[ \frac{\sqrt{x}}{\sqrt{4+\sqrt{x}} - 2} \right]$

- A) 0                      B)  $\frac{1}{4}$                       C) 4                      D) 8

32.  $\lim_{x \rightarrow -\infty} \left( \frac{5x-2}{\sqrt{3x^2+1}} \right)$

- A)  $-\frac{5}{3}$                       B)  $\frac{5\sqrt{3}}{3}$                       C)  $\frac{5}{3}$                       D) does not exist

33.  $\lim_{x \rightarrow 5} f(x)$  is non-existent if  $f(x) =$

- A)  $\frac{x^2-25}{x-5}$                       B)  $\sin(x-5)$                       C)  $\frac{x}{x^2-5x}$                       D)  $\frac{x-5}{x}$

34.  $\lim_{x \rightarrow 0} \frac{\sqrt{6+2x} - \sqrt{6+x^2}}{\sqrt{3+4x} - \sqrt{3-x^3}}$

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

Limits

35.  $\lim_{x \rightarrow 0} \frac{2x}{\arctan x}$

A) 0

B) 1

C)  $\frac{\pi}{2}$

D) 2

36.  $\lim_{x \rightarrow \infty} (\sqrt{x}(\sqrt{x+1} - \sqrt{x}))$

A)  $-\frac{1}{2}$

B)  $\frac{1}{2}$

C)  $\infty$

D) does not exist

37.  $\lim_{x \rightarrow 0^+} (x^2 \ln x)$

A) -1

B) 0

C)  $\frac{1}{2}$

D) does not exist

38.  $\lim_{x \rightarrow 0^+} \frac{\ln(\sin x)}{\ln(\tan x)}$

A) 0

B) 1

C)  $e$

D)  $\infty$

39.  $\lim_{x \rightarrow 0} \frac{8^x - 2^x}{4x}$

A)  $(1/2)\ln 2$

B)  $\ln 2$

C)  $4\ln 2$

D)  $8\ln 2$

40.  $\lim_{x \rightarrow \frac{1}{2}} \frac{1 - \sqrt{2x}}{2x - 1}$

A) 0

B)  $\frac{1}{4}$

C)  $\frac{3}{4}$

D)  $-\frac{1}{2}$

## Answers to Limit Problems

1. A	11. D	21. A	31. C
2. D	12. A	22. D	32. E $-\frac{5}{3}\sqrt{3}$
3. A	13. D	23. A	33. C
4. D	14. C	24. D	34. C
5. A	15. A	25. C	35. D
6. B	16. D	26. C	36. B
7. B	17. D	27. B	37. B
8. C	18. B	28. E -2	38. B
9. B	19. C	29. E +1	39. A
10. A	20. C	30. D	40. D