



# INDIAN SCHOOL AL WADI AL KABIR

DEPARTMENT OF MATHEMATICS 2025 – 2026

Work Sheet- Limits and Derivatives – Class XI



1.	$\lim_{x \rightarrow \pi} \frac{\sin x}{x - \pi}$ is - (a) 1 (c) -1	(b) 2 (d) does not exist.
2.	If $\lim_{x \rightarrow 2} \frac{x^n - 2^n}{x - 2} = 80$ , then n is - (a) 2 (c) 4	(b) 3 (d) 5.
3.	If $L = \lim_{x \rightarrow 1} \frac{x^4 - 1}{x^3 - 1}$ , then 3L is - (a) 2 (c) 4	(b) 3 (d) None of these.
4.	$\lim_{x \rightarrow 0} \frac{(1+x)^{16} - 1}{(1+x)^4 - 1}$ is - (a) 0 (c) 8	(b) 4 (d) 16.
5.	$\lim_{x \rightarrow 1} \frac{x + x^2 + x^3 + x^4 - 4}{x - 1}$ is - (a) 0 (c) 10	(b) 4 (d) Does not exist.
6.	$\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sec^2 x - 2}{\tan x - 1}$ is - (a) 0 (c) 2	(b) 1 (d) 4.
7.	If $y = \sin^4 x + \cos^4 x$ , then $\frac{dy}{dx} =$ (a) $4\sin^3 x + 4\cos^3 x$ (c) $-\sin 4x$	(b) $4\sin^3 x - 4\cos^3 x$ (d) 0.
8.	Evaluate $\lim_{x \rightarrow 0} \frac{(1+x)^m - 1}{(1+x)^n - 1}$	9. Evaluate $\lim_{x \rightarrow 0} \frac{(\sin 2x) + 3x}{2x + (\tan 3x)}$
10.	Evaluate $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{1 - \cos 4x}$	11. Differentiate $\frac{\sin x}{x}$ with respect to x.
12.	Differentiate $x^3 + 3^3 + 3^x$ with respect to x	

13.	Evaluate: $\lim_{x \rightarrow 0} \frac{\sqrt{1+x}-1}{x}$	14	Differentiate $\frac{x^8-1}{x^4-1}$ with respect to x.
Evaluate the following Limits			
15.	$\lim_{x \rightarrow \infty} \frac{2x^8-3x^2+1}{x^8+6x^5-7}$	16	$\lim_{x \rightarrow 1} \frac{2x^8-3x^2+1}{x^8+6x^5-7}$
17	$\lim_{x \rightarrow 0} \frac{1-\cos 2x}{x \cdot \tan 3x}$	18	$\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{x - \frac{\pi}{4}}$
19	$\lim_{x \rightarrow \frac{\pi}{6}} \frac{\sqrt{3} \sin x - \cos x}{\frac{\pi}{6} - x}$	20	$\lim_{x \rightarrow 0} \frac{\sin x}{\tan x^0}$ (where $x^0$ represents x degree)
21	$\lim_{x \rightarrow 9} \frac{x^{\frac{3}{2}} - 27}{x^2 - 81}$	22	$\lim_{x \rightarrow a} \frac{(x+2)^{\frac{5}{2}} - (a+2)^{\frac{5}{2}}}{x-a}$
23	$\lim_{x \rightarrow \pi} \frac{1 + \sec^3 x}{\tan^2 x}$	24	$\lim_{x \rightarrow 2} \left[ \frac{4}{x^3 - 2x^2} + \frac{1}{2-x} \right]$
25	Find the values of a and b if $\lim_{x \rightarrow 2} f(x)$ and $\lim_{x \rightarrow 4} f(x)$ exists where $f(x) = \begin{cases} x^2 + ax + b, & 0 \leq x < 2 \\ 3x + 2, & 2 \leq x \leq 4 \\ 2ax + 5b, & 4 < x < 8 \end{cases}$		

### Answers

1.	C	11	$\frac{x \cos x - \sin x}{x^2}$	21	1/4
2.	D	12	$3x^2 + 3x \cdot \log 3$	22	$\frac{5(a+2)^{\frac{3}{2}}}{2}$
3.	C	13.	1/2	23	-3/2
4.	B	14.	$4X^3$	24	-1
5.	C	15.	2	25	a = -1, b = 6
6.	C	16.	5/17		
7.	C	17	2/3		
8.	m/n	18.	$\sqrt{2}$		
9.	1	19	2		
10.	1/4	20	$180^0 / \pi$		