

**SUB-MATHEMATICS**  
**CHAPTER:-LIMITS & DERIVATIVES**  
**WORKSHEET (STANDARD)**  
**CLASS:-XI**

1. Find:  $\lim_{x \rightarrow 1} \frac{\log_e x}{x-1}$
2. Find:  $\lim_{x \rightarrow \pi/2} \frac{1 - \sin x}{(\pi - 2x)^2}$
3. Find:  $\lim_{x \rightarrow 0} \frac{10^x - 5^x - 2^x + 1}{x^2}$
4. If  $\alpha$  and  $\beta$  are the roots of  $ax^2 + bx + c$ , then find  $\lim_{x \rightarrow \beta} \frac{1 - \cos(ax^2 + bx + c)}{(x - \beta)^2}$
5. Evaluate:  $\lim_{x \rightarrow \pi/6} \frac{\sqrt{3} \sin x - \cos x}{(x - \frac{\pi}{6})}$
6. Evaluate:  $\lim_{x \rightarrow 0} \frac{\tan x - \sin x}{x^3}$
7. Evaluate:  $\lim_{x \rightarrow 1} \frac{(2x - 3)(\sqrt{x} - 1)}{2x^2 + x - 3}$
8. Evaluate:  $\lim_{x \rightarrow 4} \frac{x - 4}{3 - \sqrt{13 - x}}$
9. Evaluate:  $\lim_{x \rightarrow 0} \frac{e^x + e^{-x} - 2}{x^2}$
10. Evaluate:  $\lim_{x \rightarrow 0} \frac{x 2^x - x}{\sqrt{1 + x^2} - 1}$
11. Evaluate:  $\lim_{x \rightarrow 0} \frac{\sqrt{1 + 2x} - \sqrt{1 - 2x}}{\sin x}$

**SECTION - C**

12. Evaluate:  $\lim_{h \rightarrow 0} \frac{(x + h)^2 \sin(x + h) - x^2 \sin x}{h}$
13. Evaluate:  $\lim_{x \rightarrow 0} \frac{1 + \cos 2x}{(\pi - 2x)^2}$
14. Evaluate:  $\lim_{x \rightarrow 0} \frac{\cos ax - \cos bx}{\cos cx - 1}$
15. Evaluate:  $\lim_{x \rightarrow a} \frac{\sin \sqrt{x} - \sin \sqrt{a}}{x - a}$
16. Evaluate:  $\lim_{x \rightarrow 0} \frac{1 - \cos x \cos 2x \cos 3x}{\sin^2 2x}$
17. If  $y = (ax + b)^2(cx + d)^2$ , find  $\frac{dy}{dx}$ .
18. Find  $\frac{dy}{dx}$  from 1<sup>st</sup> principle: (i)  $f(x) = e^{\sqrt{x}}$

$$(ii) f(x) = \sqrt{\cos x}$$

$$(iii) f(x) = \tan (ax + b)$$

$$(iv) f(x) = \sin^2 x$$

19. Find  $\frac{dy}{dx}$ , if (i)  $f(x) = \frac{3x+4}{5x^2-7x+9}$

$$(ii) f(x) = \frac{x \tan x}{\sec x + \tan x}$$

$$(iii) f(x) = \frac{\sin x - x \cos x}{x \sin x + \cos x}$$