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

1. Evaluate: $\lim\limits_{x \to a} \dfrac{\sqrt{x + 2a} - \sqrt{3x}}{\sqrt{x + 3a} - 2\sqrt{x}}$

2. Evaluate: $\lim\limits_{x \to 1} \dfrac{x^4 - 3x^3 + 2}{x^3 - 5x^2 + 3x + 1}$

3. Evaluate: $\lim\limits_{x \to 0} \dfrac{1 - \cos x\sqrt{\cos 2x}}{x^2}$

4. Evaluate: $\lim\limits_{x \to 0} \dfrac{e^{1/x} - 1}{e^{1/x} + 1}$

5. Evaluate: $\lim\limits_{y \to 0} \dfrac{(x + y)\sec(x + y) - x\sec x}{y}$

6. Evaluate: $\lim\limits_{x \to 0} \dfrac{\tan x^\circ}{x}$

7. Prove that $\lim\limits_{x \to 2} \dfrac{3^x + 3^{3-x} - 12}{3^{3-x} - 3^{x/2}} = \dfrac{-4}{3}$

8. Find $\lim\limits_{x \to \sqrt{2}} \dfrac{x^9 - 3x^8 + x^6 - 9x^4 - 4x^2 - 16x + 84}{x^5 - 3x^4 - 4x + 12}$

9. Find $\lim\limits_{x \to 0} \dfrac{\tan x + 4\tan 2x - 3\tan 3x}{x^2 \tan x}$

10. Evaluate: $\lim\limits_{x \to \pi} \dfrac{\sqrt{2 + \cos x} - 1}{(\pi - x)^2}$

11. Evaluate: $\lim\limits_{x \to e} \dfrac{\log x - 1}{x - e}$

12. Evaluate: $\lim\limits_{x \to 0} \dfrac{\log(6 + x) - \log(6 - x)}{x}$

13. Find the derivative of $f(x)$ from 1st principle: (i) $f(x) = e^{\sqrt{\tan x}}$

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

                                            (iii) $f(x) = x\sin x$

                                            (iv) $f(x) = \cos(x^2 + 1)$