Term Work Assignment-1(TWA1: CO-2)
Indeterminate Forms and L'Hospital's Rule

MATHEMATICS-1: BE01R00041

Date: 31-07-25

Exercise: Evaluate the following limits

1. $\lim_{x \to 0} \frac{e^x + e^{-x} - x^2 - 2}{\sin^2 x - x^2}$

2. $\lim_{x \to 1} \frac{x^x - x}{x - 1 - \log x}$

3. $\lim_{x \to 0} \frac{\tan x - \sin x}{\sin^3 x}$

4. $\lim_{x \to 0} \frac{\cosh x - \cos x}{x \sin x}$

5. $\lim_{x \to a} \frac{x^a - a^x}{x^x - a^a}$

6. $\lim_{x \to 0} \frac{e^x \sin x - x - x^2}{x^2 + x \log(1-x)}$

7. If $\lim_{x \to 0} \frac{\sin 2x + a \sin x}{x^3}$ be finite, find the value of a and hence limit.

8. If $\lim_{x \to 0} \frac{x(1 + a \cos x) - b \sin x}{x^3} = 1$, find the value of a and b.

9. $\lim_{x \to 1} \left(\frac{x}{x-1} - \frac{1}{\log x} \right)$

10. $\lim_{x \to 0} \left(\frac{1}{2x} - \frac{1}{x(e^{\pi x} + 1)} \right)$

11. $\lim_{x \to 0} \left(\frac{1}{x^2} - \cot^2 x \right)$

12. $\lim_{x \to 0} \left(\frac{e^x + e^{2x} + e^{3x}}{3} \right)^{1/x}$

13. $\lim_{x \to 0} \left(\frac{\tan x}{x} \right)^{1/x^2}$

14. $\lim_{x \to 0} (\cos x)^{\cot x}$

15. $\lim_{x \to \infty} \left(a^{1/x} - 1 \right)^x$