

Subject: Engineering Mathematics

DPP-03

Chapter: Calculus

Topic : Sandwich Theorem & Double Limits

1. Evaluate: $\lim_{x \rightarrow 0} \left(\frac{1}{x^2} - \frac{1}{\sin^2 x} \right)$
- (a) $1/3$ (b) $-1/2$
(c) $-1/3$ (d) $-1/4$

2. Find: $\lim_{x \rightarrow 0} \left(\frac{\tan x}{x} \right)^{\frac{1}{x^2}}$
- (a) $e^{1/3}$ (b) $e^{1/2}$
(c) $e^{2/3}$ (d) None

3. The value of $\lim_{x \rightarrow 8} \frac{\frac{1}{x^3} - 2}{(x-8)}$
- (a) $\frac{1}{16}$ (b) $\frac{1}{12}$
(c) $\frac{1}{8}$ (d) $\frac{1}{4}$

4. What is the value of $\lim_{\substack{x \rightarrow 0 \\ y \rightarrow 0}} \frac{xy}{x^2 + y^2}$
- (a) 1 (b) -1
(c) 0 (d) Limit does not exist

5. Evaluate: $\lim_{x \rightarrow 0} \frac{x - \sin x}{x^3}$
- (a) $1/2$ (b) 2
(c) $1/6$ (d) 0

6. Evaluate the limit of the following function as $(x, y) \rightarrow (0, 0)$

$$f(x, y) = \frac{x^3 y^3}{x^2 + y^2}$$

- (a) Limit exists
(b) Limit does not exist
(c) Limit is dependent of path chosen
(d) None

7. Evaluate the limit for the functions $f(x, y) = \frac{x^3 + y^3}{x - y}$,
 $(x, y) \neq (0, 0)$ at origin.

- (a) Limit exists
(b) Limit does not exist
(c) Limit is dependent of path chosen
(d) None

8. Evaluate the limit of $f(x, y) = \frac{x^2 - y^2}{x^2 + y^2}$,
as $(x, y) \rightarrow (0, 0)$.

- (a) Limit is independent of path chosen
(b) Limit exist
(c) Limit does not exist
(d) None

1. (c)
2. (a)
3. (b)
4. (d)

5. (c)
6. (a)
7. (b)
8. (c)



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