

40 Lecture - MTH101

Important Mcqs

Which of the following is an indeterminate form that can be solved using L'Hopital's rule?

- a) $5/0$
- b) $0/5$
- c) $0/0$
- d) $5/5$

Answer: c) $0/0$

L'Hopital's rule can only be used for:

- a) Limits of indeterminate forms
- b) Limits that converge to a finite value
- c) Limits that diverge to infinity
- d) None of the above

Answer: a) Limits of indeterminate forms

What is the general form of L'Hopital's rule?

- a) $\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{f'(x)}{g'(x)}$
- b) $\lim_{x \rightarrow a} \frac{c f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{c f'(x)}{g'(x)}$
- c) $\lim_{x \rightarrow a} \frac{0 f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{0 f'(x)}{g'(x)}$
- d) None of the above

Answer: b) $\lim_{x \rightarrow a} \frac{c f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{c f'(x)}{g'(x)}$

Which of the following is an example of an indeterminate form $0/0$?

- a) $\lim_{x \rightarrow 0} \frac{\sin(x)}{x}$
- b) $\lim_{x \rightarrow \infty} \frac{e^x}{x^2}$

c) $\lim_{x \rightarrow \infty} \frac{\ln(x)}{x}$

d) None of the above

Answer: b) $\lim_{x \rightarrow \infty} \frac{e^x}{x^2}$

L'Hopital's rule can be applied:

a) Once

b) Twice

c) Multiple times

d) None of the above

Answer: c) Multiple times

Which of the following is an example of an indeterminate form $0 \cdot \infty$?

a) $\lim_{x \rightarrow \infty} \frac{(x+1)}{(x-1)}$

b) $\lim_{x \rightarrow 0} \frac{(1 - \cos(x))}{x^2}$

c) $\lim_{x \rightarrow \infty} x \ln(x)$

d) None of the above

Answer: c) $\lim_{x \rightarrow \infty} x \ln(x)$

Which of the following is an example of an indeterminate form $\infty - \infty$?

a) $\lim_{x \rightarrow 0} \frac{(1 - \cos(x))}{x^2}$

b) $\lim_{x \rightarrow \infty} (x - e^x)$

c) $\lim_{x \rightarrow \infty} \frac{(x^2 + 1)}{(x + 1)}$

d) None of the above

Answer: b) $\lim_{x \rightarrow \infty} (x - e^x)$

L'Hopital's rule fails to solve indeterminate forms when:

a) The limit is not an indeterminate form

b) The limit is a determinate form

c) The limit does not exist

d) None of the above

Answer: c) The limit does not exist

Which of the following is an example of an indeterminate form $0/0$?

a) $\lim_{x \rightarrow 1} (x - 1) / (x^2 - 1)$

b) $\lim_{x \rightarrow ?} (1 + 1/x)^x$

c) $\lim_{x \rightarrow 0} \ln(x) / x$

d) None of the above

Answer: a) $\lim_{x \rightarrow 1} (x - 1) / (x^2 - 1)$

Which of the following is an example of an indeterminate form $? / ?$?

a) $\lim_{x \rightarrow 0} \sin(x) / x$

b) $\lim_{x \rightarrow ?} e^x$