

6 Lecture - MTH101

Important Mcqs

1. What is the limit of the function $f(x) = 2x + 1$ as x approaches 3?

- a) 5
- b) 7
- c) 8
- d) 9

Answer: b) 7

Solution: When x approaches 3, the value of $f(x)$ approaches $(2 \cdot 3 + 1) = 7$.

2. Which of the following functions is continuous at $x = 0$?

- a) $f(x) = 1/x$
- b) $f(x) = x^2$
- c) $f(x) = |x|$
- d) $f(x) = \sqrt{x}$

Answer: b) $f(x) = x^2$

Solution: The function $f(x) = x^2$ is continuous at $x = 0$ because the limit of $f(x)$ as x approaches 0 is equal to $f(0) = 0$.

3. What is the derivative of the function $f(x) = x^3$?

- a) $3x^2$
- b) $2x^3$
- c) $4x^3$
- d) x^2

Answer: a) $3x^2$

Solution: The derivative of $f(x) = x^3$ is $f'(x) = 3x^2$.

4. What is the integral of the function $f(x) = 1/x$?

- a) $\ln(x) + C$
- b) $x^2/2 + C$
- c) $2x + C$
- d) $e^x + C$

Answer: a) $\ln(x) + C$

Solution: The integral of $f(x) = 1/x$ is $F(x) = \ln|x| + C$.

5. What is the domain of the function $f(x) = \sqrt{x - 4}$?

- a) $(-\infty, 4]$
- b) $[4, \infty)$
- c) $[0, \infty)$
- d) $(-\infty, \infty)$

Answer: b) $[4, \infty)$

Solution: The function $f(x) = \sqrt{x - 4}$ is defined only for $x \geq 4$, which gives the domain $[4, \infty)$.

6. What is the limit of the function $f(x) = \sin(x)/x$ as x approaches 0?

- a) 0
- b) 1
- c) -1
- d) does not exist

Answer: b) 1

Solution: The limit of $f(x) = \sin(x)/x$ as x approaches 0 is 1, which can be proved using L'Hopital's rule or the squeeze theorem.

7. Which of the following functions is not differentiable at $x = 0$?

- a) $f(x) = |x|$
- b) $f(x) = x^2$
- c) $f(x) = \sqrt{x}$
- d) $f(x) = 1/x$

Answer: a) $f(x) = |x|$

Solution: The function $f(x) = |x|$ is not differentiable at $x = 0$ because it has a sharp point at that point.

8. What is the integral of the function $f(x) = 2x$?

- a) $x^2 + C$
- b) $x^2 + 1$
- c) $x^3 + C$
- d) $2x^2 + C$

Answer: a) $x^2 + C$

Solution: The integral of $f(x) = 2x$ is $F(x) = x^2 + C$.

9. What is the limit of the function $f(x) = (x^2 - 4)/(x - 2)$ as x approaches 2?

- a) 0
- b) 1
- c) 2
- d) does not exist

Answer: c)