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*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) (-infinity, 4]
   b) [4, infinity)
   c) [0, infinity)
   d) (-infinity, infinity)
   Answer: b) [4, infinity)

Solution: The function f(x) = sqrt(x - 4) is defined only for x >= 4, which gives the domain [4, infinity).

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)