

# 15 Lecture - MTH101

## Important Mcqs

**What is the derivative of  $f(x) = x^2$  at  $x = 3$ ?**

- a) 3
- b) 6
- c) 9
- d) 12

**Answer: b) 6 (Using the power rule,  $f'(x) = 2x$ , so  $f'(3) = 2(3) = 6$ )**

**What is the derivative of  $f(x) = \cos(x)$  at  $x = \pi/4$ ?**

- a) -1
- b)  $-\sin(\pi/4)$
- c)  $\cos(\pi/4)$
- d)  $-\cos(\pi/4)$

**Answer: d)  $-\cos(\pi/4)$  (Using the chain rule,  $f'(x) = -\sin(x)$ , so  $f'(\pi/4) = -\sin(\pi/4) = -\cos(\pi/4)$ )**

**What is the derivative of  $f(x) = e^x$  at  $x = 0$ ?**

- a) 0
- b) 1
- c) e
- d)  $e^{-1}$

**Answer: b) 1 (Using the power rule,  $f'(x) = e^x$ , so  $f'(0) = e^0 = 1$ )**

**What is the derivative of  $f(x) = \ln(x)$  at  $x = 1$ ?**

- a) 0
- b) 1

c) -1

d) undefined

Answer: b) 1 (Using the derivative of  $\ln(x)$ ,  $f'(x) = 1/x$ , so  $f'(1) = 1/1 = 1$ )

**What is the derivative of  $f(x) = 5x^4 - 3x^2 + 2x - 1$ ?**

a)  $20x^3 - 6x + 2$

b)  $20x^3 - 6x^2 + 2$

c)  $20x^3 - 6x + 1$

d)  $20x^4 - 6x^2 + 2$

Answer: a)  $20x^3 - 6x + 2$  (Using the power rule,  $f'(x) = 20x^3 - 6x^2 + 2$ )

**What is the derivative of  $f(x) = \sqrt{x}$  at  $x = 4$ ?**

a)  $1/8$

b)  $1/4$

c)  $1/2$

d) 2

Answer: b)  $1/4$  (Using the derivative of  $\sqrt{x}$ ,  $f'(x) = 1/(2\sqrt{x})$ , so  $f'(4) = 1/(2\sqrt{4}) = 1/4$ )

**What is the derivative of  $f(x) = \sin(x) + \cos(x)$  at  $x = \pi/3$ ?**

a)  $-1/2$

b) 0

c)  $1/2$

d)  $\sqrt{3}/2$

Answer: c)  $1/2$  (Using the sum rule and the derivative of  $\sin(x)$  and  $\cos(x)$ ,  $f'(x) = \cos(x) - \sin(x)$ , so  $f'(\pi/3) = \cos(\pi/3) - \sin(\pi/3) = 1/2 - \sqrt{3}/2 = 1/2 - 1/2\sqrt{3} = 1/2(1 - 1/\sqrt{3}) = 1/2(1 - \sqrt{3}/3) = 1/2 - \sqrt{3}/6 = 1/2 - 0.289 = 0.211$ )

**What is the derivative of  $f(x) = 1/x$  at  $x = 2$ ?**

a)  $-1/4$

b)

