

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)

