

## MATHEMATICS EXAMINATION

Total Points: 100 | Questions: 7 | Date: November 17, 2025

*Answer all questions. Time allowed: 3 hours.*

### Question 1

Solve the quadratic equation  $x^2 - 5x + 6 = 0$  .

### Question 2

Evaluate the integral  $\int_0^1 x^2 dx$  .

### Question 3

Find the limit  $\lim_{x \rightarrow 0} \frac{\sin(x)}{x}$  .

### Question 4

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

- A.  $3x^2 + 4x - 1$
- B.  $3x^2 + 4x + 1$
- C.  $x^4 + 2x^3 - x^2 + 5x$
- D.  $3x^2 - 4x - 1$

**Question 5**

A particle moves according to the equation  $s(t) = 3t^2 - 2t + 1$ , where

$s$  is displacement in meters and

$t$  is time in seconds. Find the velocity at

$t = 2$  seconds.

**Question 6**

Given the system of equations:

$$2x + y = 7$$

$$x - y = 2$$

Solve for  $x$  and  $y$ .

**Question 7**

Prove that  $\frac{d}{dx}[\sin(x)] = \cos(x)$  using the definition of derivative.