

**Mathematics 101 - Final Examination**

Fall Semester 2025

Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

**Instructions:**

- This exam has 5 problems worth 100 points total.
- Show all work for full credit.
- You have 120 minutes to complete this exam.
- No calculators or notes allowed.

Problem	Points	Score
1	20	
2	20	
3	20	
4	20	
5	20	
<b>Total</b>	<b>100</b>	

**Problem 1.** (20 points) Solve the following equation for  $x$ :

$$3x^2 - 7x + 2 = 0$$

**Problem 2.** (20 points) Find the derivative of:

$$f(x) = \frac{\sin(x)}{x^2 + 1}$$

**Problem 3.** (20 points) Evaluate the integral:

$$\int_0^1 xe^{x^2} dx$$

**Problem 4.** (20 points) Prove that if  $a$  and  $b$  are even integers, then  $a + b$  is even.

**Problem 5.** (20 points) Find the limit:

$$\lim_{x \rightarrow 0} \frac{\sin(3x)}{2x}$$