ETH Zürich
PEACH-Lab

AI-assisted grading UI – testing exam
Basic math

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Name: _____
Student ID: _____

This exam contains 6 pages (including this cover page) and 4 questions. Total of points is 31.
Good luck!

Distribution of Marks

Question	Points	Score
1	8	
2	6	
3	9	
4	8	
Total:	31	

1. (8 points) Consider the function $f(x) = x^3 - 3x^2 - 9x + 5$. Find all the local maximum and local minimum points (both x and y coordinates).

2. (6 points) Find the area of the region enclosed by the parabola $y = x^2$ and the line $y = x + 2$.

3. Consider the following system of linear equations:

$$\begin{cases} \text{x} + \text{y} + \text{z} = 6 \\ 2\text{y} + 5\text{z} = \text{-}4 \\ 2\text{x} + 5\text{y} - \text{z} = 27 \end{cases}$$

   (a) (3 points) Write the system in it's augmented matrix form $[A|b]$.

   (b) (6 points) Solve the system for x, y and z using Gaussian elimination. Show your steps.

4. A factors has two machines, Machine A and Machine B, producing microchips.

   - Machine A produces 60% of the total chips.
   - Machine B produces 40% of the total chips.
   - The defect rate of Machine A is 5% (i.e., 5% of chips from A are defective)
   - The defect rate of Machine B is 2% (i.e., 2% of chips from B are defective)

   (a) (4 points) What is the overall probability that a randomly selected chip from the factory is defective?

   (b) (4 points) A chip is randomly selected and found to be defective. What is the probability that it came from Machine A?

This page is intentionally left blank to accommodate work that wouldn't fit elsewhere and/or scratch work.