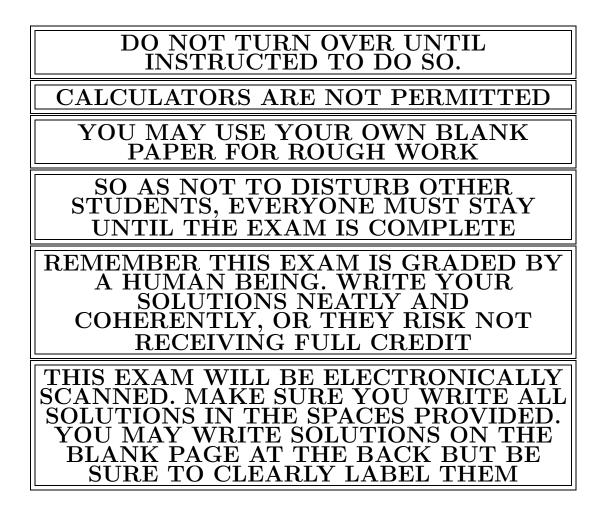
MATH 16A MIDTERM 1(PRACTICE 2) PROFESSOR PAULIN



Name and section:

GSI's name: _____

This exam consists of 5 questions. Answer the questions in the spaces provided.

1. (25 points) (a) Determine the equation of the straight (in the xy-plane) which contains the points (1, 4) and (-1, 3)
Solution:

(b) Calculate the x-intercept of the straight line containing (3, 2), which is perpendicular to the line in (a).Solution:

2. (25 points) A product is to be produced and sold. The cost function C(x) is linear, with marginal cost of 1 and fixed cost of 4. The revenue function is

$$R(x) = x^2 + x$$

(a) Determine the break-even quantity. Solution:

(b) What is the marginal profit at this quantity? You must calculate this from first principles using limits.Solution:

Calculate the following limits. If they do not exist determine if they are ∞ or -∞.
 (a)

$$\lim_{x \to -1} \frac{x^2 + 3x + 2}{x^2 - x - 2}$$

Solution:

(b)

$$\lim_{x \to -\infty} \sqrt[3]{\frac{4x}{7x^2 + 5}}$$

Solution:

(c) $\lim_{x \to 1^{-}} \frac{1-x}{x^2 - 2x + 1}$

Solution:

4. Let $f(x) = \begin{cases} \frac{x-1}{\sqrt{x-1}} + a^2 & \text{if } x > 1\\ a - x^2 & \text{if } x \le 1 \end{cases}$ for some real number a.

Is it possible to choose a real number a such that f(x) continuous at x = 1? Carefully justify your answer.

Solution:

5. Using limits, calculate the derivative of f(x) = x/(x+1). Determine the points on the graph y = f(x) where the slope of the tangent line is 2.
Solution: