MATH 1210-90 Fall 2011

First Midterm Exam

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LAST NAME _____

FIRST NAME Grader's Copy

ID NO. _____

INSTRUCTION: SHOW ALL OF YOUR WORK. MAKE SURE YOUR ANSWERS ARE CLEAR AND LEGIBLE. USE **SPECIFIED** METHOD TO SOLVE THE QUESTION. IT IS NOT NECESSARY TO SIMPLIFY YOUR FINAL ANSWERS.

PROBLEM 1	20	_____
PROBLEM 2	20	_____
PROBLEM 3	20	_____
PROBLEM 4	20	_____
PROBLEM 5	20	_____
TOTAL	100	_____

PROBLEM 1

(20 pt) Find the equation of the circle having the segment from $(1, 3)$ to $(7, 11)$ as a diameter.

midpoint $\frac{1}{2}[(7, 11) + (1, 3)]$

$= (4, 7)$ (5 pt)

(enter

diameter $\|(7, 11) - (1, 3)\|$

$= 10$ (5 pt)

radius $= 5$

equation: $(x - 4)^2 + (y - 7)^2 = 5^2$

(10 pt)

PROBLEM 2

(20 pt) Find the equation of the line which bisects the line segment from $(0,0)$ to $(2,6)$ at right angles.

line passing through the midpoint

$\frac{1}{2}[(0,0)+(2,6)] = (1,3)$

(5 pt)

$(\text{slope}) \cdot \frac{6-0}{2-0} = -1$

(10 pt)

$\text{slope} = -\frac{1}{3}$

equation: $(y-3) = -\frac{1}{3}(x-1)$

No need to simplify

(5 pt)

PROBLEM 3

(20 pt) Find

a. $\lim_{x\to 2} \dfrac{x^2+3x-10}{x^2+x-6}$

b. $\lim_{x\to 1} \dfrac{x-1}{\sqrt{x}-1}$

(a) $\lim_{x\to 2} \dfrac{x^2+3x-10}{x^2+x-6} \overset{\frac{0}{0}}{=} \lim_{x\to 2} \dfrac{(x-2)(x+5)}{(x-2)(x+3)}$ (5 pt)

$= \lim_{x\to 2} \dfrac{x+5}{x+3} = \dfrac{7}{5}$ (5 pt)

(b) $\lim_{x\to 1} \dfrac{x-1}{\sqrt{x}-1} \overset{\frac{0}{0}}{=} \lim_{x\to 1} \dfrac{(x-1)(\sqrt{x}+1)}{x-1}$ (5 pt)

$= \lim_{x\to 1} \sqrt{x}+1 = 2$ (5 pt)

PROBLEM 4

(20 pt) Find

a. $\lim_{t \to 0} \dfrac{t^2 \cos t}{t+1}$

b. $\lim_{x \to 1} \dfrac{\sin 4x}{\tan x}$

a. $\lim_{t \to 0} = \dfrac{0}{1} = 0$ (10 pt)

b. $\lim_{x \to 1} = \dfrac{\sin 4}{\tan 1}$ (10 pt)

PROBLEM 5

(20 pt) Find

a. $\lim_{x\to\infty} \frac{x}{x^2+1}$

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

a. $\lim_{x\to\infty} \frac{x}{x^2+1}$ (5 pt)

$= \lim_{x\to\infty} \frac{\frac{1}{x}}{x+\frac{1}{x}} = \frac{1}{\infty} = 0$ (5 pt)

$x \to \infty$

0

b. $\lim_{x\to-\infty} \frac{2x^3}{x^3+1} = \lim_{x\to-\infty} \frac{2}{1+\frac{1}{x^3}}$ (5 pt)

$x \to -\infty$

0

$= \frac{2}{1}$ (5 pt)