Name: _____
TA's Name/Section #: _____
Recitation Day/Time: _____

Math 165: Midterm v.1

Part I

Spring 2013

This part of the exam has 8 problems; each problem is worth 10 points.

You may **NOT** use a calculator on this section. You must show all work, but you need not simplify your answers. This part of the exam will be collected after 40 minutes.

Question 1: _____

Question 2: _____

Question 3: _____

Question 4: _____

Question 5: _____

Question 6: _____

Question 7: _____

Question 8: _____

80 **Total Points:** _____

Question 1 (10 points, 1.3). *Find the limit:*

$$\lim_{x \to -3} \frac{x^2 + 5x + 6}{x^2 - x - 12}$$

Question 2 (10 points, 1.4). *Find the limit:*

$$\lim_{x \to 0} \frac{\sin 3x}{x}$$

Question 3 (10 points, 1.5). *Evaluate the following limit at* ∞.

$$\lim_{x\to\infty} \frac{3x^2-1}{4-x^2}$$

Question 4 (10 points, 2.2). *Let* $f(x) = x^2 - 1$. *Use the definition of the derivative, as a limit of a quotient, to find* $f'(2)$.

Question 5 (10 points, 2.3). *Find the equation of the tangent line to the curve* $y = \dfrac{2x+1}{x^2+1}$ *at the point* $(0, 1)$.

Question 6 (10 points, 2.4). *Find the derivative of the function* $f(x) = \tan x(1 - \sin x)$.

Question 7 (10 points, 2.5). *Find the derivative of* $\sin 2x - 3\cos^2 x$.

Question 8 (10 points, 2.7). *Assuming the equation defines a differentiable function of* x, *find* $D_x y$ *by implicit differentiation:*

$$x^2 + 2x^2 y + 3xy = 0$$