MATH 113* MAKE_UP EXAM 1 *** Do ALL 5 problems and show ALL work.**

NAME : _____
ID # : _____
DEPARTMENT : _____
SIGNATURE : _____

Q1	Q2	Q3	Q4	Q5	TOTAL
20	20	20	20	20	100

1. Using the definition, find the equation of the tangent line to $f(x) = \dfrac{x-1}{x+1}$ at $x = 0$. (p.105, #22)

2. Find $\dfrac{dy}{dx}$ for each of the following: (Do not simplify your answers)

a) $y = \sqrt[5]{x^3} - \dfrac{1}{3x} + x^3 + \csc x^{-2} - \sin\dfrac{\pi}{2}$

b) $y = \sin^2\left(x^4 + 3\right) - \sec(\cot x)$

3. Find the limit $\lim\limits_{x\to 4} \dfrac{4-x}{5-\sqrt{x^2+9}}$. (p.55, #42)(No L'Hopital's Rule)

4. For what values of a is $f(x) = \begin{cases} a^2x - 2a & \text{if} \quad x \geq 3 \\ 12 & \text{if} \quad x < 3 \end{cases}$ continuous at every x? (p.83, #43)

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5. (a) Find the limit $\lim_{x \to 0} \dfrac{\tan 3x}{\sin 8x}$ (p.73, #39). (No L'Hopital's Rule)

(b) State the Intermediate Value Theorem.