MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

TEST 1 **MATH 1000-5** **February 17, 2003**

NAME	ID

1a	1b	2	3	4a	4b	4c	4d	5	6	7	total

(For instructor's use)

1. Evaluate each of the following limits. Show your work. If a limit does not exist, explain why, or assign ∞ or $-\infty$ if appropriate.

(a) $\lim\limits_{x\to 0} \dfrac{3x - 6x^2}{2x^3 + x^4}$

(b) $\lim\limits_{x\to 1} \dfrac{\sqrt{x+3} - 2}{2x - 2}$

2. Determine all points at which $f(x)$ is not continuous (explain why), and determine whether each discontinuity is removable. The function is

$$f(x) = \begin{cases} -3|x|, & \text{if } x < -2 \\ 6, & \text{if } x = -2 \\ \dfrac{x^3 + 8}{x^2 + 2x}, & \text{if } x > -2 \end{cases}$$

4. Find derivatives of the following functions using differentiation rules.

(a) $f(x) = 2x^2 + \dfrac{1}{(2x)^2} + e^{\pi}x - \tan\dfrac{\pi}{360}$

(b) $f(x) = 3x\sqrt{x} + \dfrac{x}{\sqrt[4]{x}}$

(c) $f(x) = -16e^x \ln x$

(d) $f(x) = \dfrac{3x^2+1}{x^3-4x}$

5. Use the Quotient Rule to show that $(x \sec x)' = \sec x\,(1 + x\tan x)$.

6. State the equation(s) of the vertical asymptote(s) to the curve $y = \dfrac{e^x \sin^2 x}{x(x^2-4)}$.

7. Find equation of the tangent line to the curve $y = 2x^2 - 3x + 2$ at the point