Practice Midterm #1

Name: _____

StudentID: _____

Major: _____

Time: 60 minutes.

Date: Tuesday, 8$^{\text{th}}$ February 2011.

Justify your solutions and show all your steps. Write down the formulae used.

Number	1	2	3	4	5	6	$\sum$
Possible Points	5	8	7	10	5	5	40
Points							

1. Evaluate the limits if they exist:
$$\lim_{x \to 7} \frac{x^2 - 5x - 14}{x^2 - 6x - 7}$$
$$\lim_{x \to -5} \frac{5x - 25}{x + 5}$$

2. (a) Write the limite definition for $f'(x)$.

   (b) Use the definition to find $f'(x)$ for $f(x) = 8x^3 - x^2 + 7$.

3. Use the definition of continuity to investigate whether $f(x)$ is continuous at $x = -2$.

$$f(x) = \begin{cases} 6 - x & \text{if } x \leq -2 \\ x^3 & \text{if } x > -2 \end{cases}$$

4. Let $f(x) = x^4 - 2x^3 - 12x^2 + x + 7$.

   (a) Write the equation of the line tangent to the graph of $y = f(x)$ at $x = 1$.

   (b) Find all points where $f'(x) = 0$.

5. If
$$\frac{dy}{dx} = \sqrt{x^2 - 4},$$

find $\frac{d^3y}{dx^3}$.

6. Find y' if
$$y = \frac{x}{\sqrt[3]{3x - 1}}.$$