

MATH 144 Fall 2008
Exam 1 Review

Name:

1. Find the following limits:

(a) $\lim_{x \rightarrow 2} (x^2 - 4x + 2)$

(b) $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3}$

(c) $\lim_{x \rightarrow 1} \frac{x^2 - 3x + 10}{x^3 - 1}$

2. Use the graph of $f(x)$ in problem 6 in section 9.1 of your textbook to find the following:

(a) $\lim_{x \rightarrow -6} f(x)$

(b) $\lim_{x \rightarrow -2} f(x)$

(c) $\lim_{x \rightarrow -2} f(x)$

3. Find the following limits:

(a) $\lim_{x \rightarrow \infty} \frac{8}{3x^2}$

(b) $\lim_{x \rightarrow \infty} \frac{5x^2 - 9}{2x - 3}$

(c) $\lim_{x \rightarrow \infty} \frac{7x^2 - 3x + 10}{4x^2 - 1}$

4. Determine whether the following function is continuous. Justify your answer using the definition of continuous function.

$$f(x) = \begin{cases} x - 4 & \text{if } x \leq 3 \\ x^2 - 8 & \text{if } x > 3 \end{cases}$$

5. Use the **limit definition** of the derivative to find the derivative of $2x^2 - 3x$.

6. Suppose the Revenue Function for a blender is $R(x) = 46x - .01x^2$, where x is the number of units sold.

(a) Find the Marginal Revenue Function, $R'(x)$.

(b) What is the Marginal Revenue when 2500 units are sold?

(c) What is the Marginal Revenue when 2000 units are sold?

7. Write the equation of the line tangent to $f(x) = \frac{2}{x^2} - x^2$ at $x = 1$.

8. (a) Find $f'(x)$ if $f(x) = \frac{1-2x^2}{x^3-4x-3}$. Do not simplify your answer.

(b) Simplify your answer.

9. Find $g'(x)$ if $g(x) = (4x^2 + 1/x + 3)(\sqrt[5]{x} - 2\sqrt{x} - 4)$.
10. If the revenue function for a product is $120x$ and the cost function is given by $500 + x^2 + x$ where x is the number of products produced and sold,
- (a) Find the Profit function.
 - (b) Find the Marginal Profit function.
 - (c) Find the Marginal Profit when $x = 8$.
11. Find the derivative of the following functions:
- (a) $y = (3x^2 - 4x + 2)^5$
 - (b) $g(x) = \frac{2x}{(x+1)^5}$
 - (c) $h(x) = \sqrt{\frac{4x^2 - 5x}{3x^3 - 4x}}$
12. Find the third derivative of $1/x + \sqrt[3]{x} + 3x^5$.