Math 155 (Section 1) Quiz 1 (Section 3.1- Section 3.6)
Due before class on Wednesday, September 25, 2002

Name(Print)_____   Student ID_____   Grade_____

1. Find following limits:

   (a) $\lim\limits_{x \to 2} \dfrac{x^2 - 4x + 4}{x^2 + x - 6}$ (b) $\lim\limits_{x \to 25} \dfrac{5 - \sqrt{x}}{25 - x}$ (c) $\lim\limits_{\theta \to 0} \dfrac{1 - \cos\theta}{\sin 2\theta}$

   (d) $\lim\limits_{x \to 0} \dfrac{\sin(x^2)\cos(2x)}{x^2}$ (e) $\lim\limits_{x \to 1} \dfrac{|x^2 - 1|}{x^2 - 3x + 2}$

2. Find c such that f is continuous at $x = 1$, where,
   $$f(x) = \begin{cases} 3x^2 + 2cx & \text{if } x < 1 \\ \frac{2x+5c}{x+1} & x > 1 \end{cases}.$$

3. Show $x^3 - 4x + 1 = 0$ has one solution on $[-3, 3]$.

4. Find the derivatives of the following functions.

   (a) $f(x) = 6x^6 - 5x^4 + 3x^2 + 5x + 6$

   (b) $g(t) = (3t^3 + 2)^4$

   (c) $g(x) = (-4x^3 + 4x^2 + 3)(1 - 4x^5)$

   (d) $f(t) = \frac{t^3 + 1}{1 - 3t^5}$

   (e) $p(x) = x^{3/5} + x^{1/5} - \frac{3}{5\sqrt[3]{x^7}}$

5. Given $h(x) = f(g(x))$, and $f(4) = -1$, $f(-2) = 1$, $f'(4) = 2$, $f'(-2) = 3$, $g(1) = 4$, $g'(1) = -2$. Find $h'(1)$.

6. Find the equation of the tangent line to the curve given by $y(x) = (3 + x^2)^{3/2}$ at $x = 2$.

7. The sum of two positive numbers is 48. What is the smallest possible value of the sum of their squares?

8. Find the extrma(maximum and minimum) of the function $f(x) = x^{1/2} - x^{3/2}$ on the interval $0, 4]$.

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