Test 1 **MA 125-CT** **September 11, 2013**

Name: _____ **Signature:** _____

SHOW ALL YOUR WORK!

If you have time, find a way to check your answers.

Part 1

1. [7 points] Evaluate $\lim_{t\to 0} \frac{\cos(7t)}{6t-7}$

2. [7 points] Evaluate $\lim_{x\to 0^-} \frac{x}{|x|}$ - Note that this is a left-sided limit

3. [7 points] Evaluate $\lim_{x\to\infty} \frac{9}{x^2}$

4. [7 points] Evaluate $\lim_{w\to 0} \dfrac{\sin(9w)}{7w}$

5. [7 points] Use the definition of continuity to evaluate [note that your answer must be a number]

$$\lim_{t\to 0} \cos(t + \sin(t))$$

6. [7 points] For what (numerical) value of the constant c is the function

$$f(x) = \begin{cases} x^4 + cx & \text{if} \quad x > -1 \\ cx^2 + x & \text{if} \quad x \leq -1 \end{cases}$$

continuous on $(-\infty, \infty)$? (Justify your answer!)

Part 2

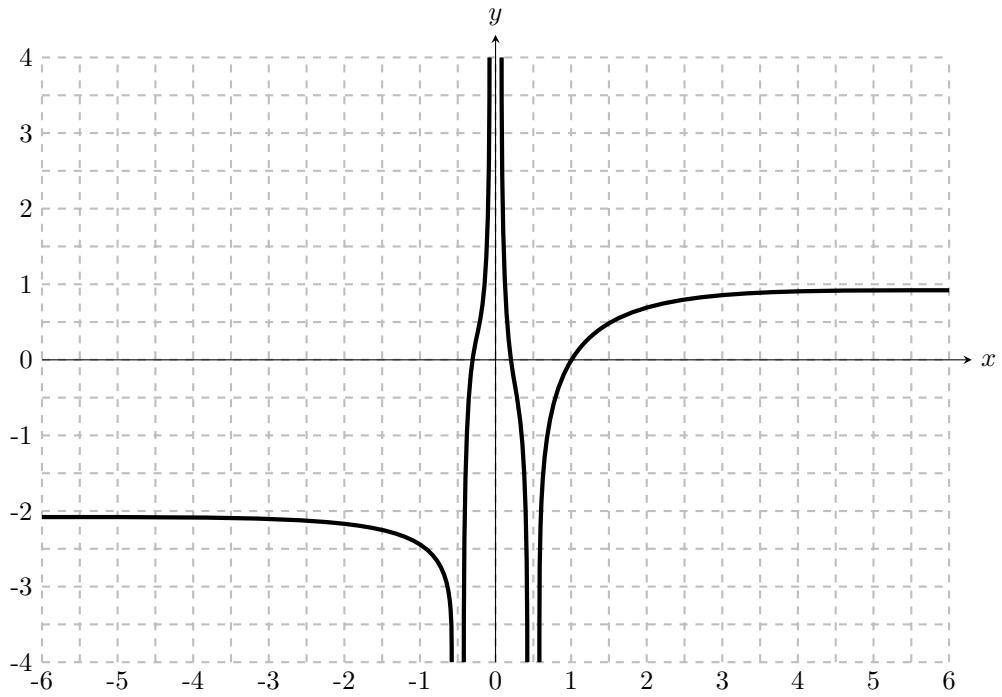
1. [12 points] Evaluate the following limits (allow for infinite limits):

   (a) $\lim_{v \to 0} \dfrac{1 + \cos(v)}{|v|}$

   (b) $\lim_{v \to 0} \dfrac{1 - \cos^2(2v)}{v^2}$

2. [21 points] Find all asymptotes (horizontal or vertical) of the function $y = \dfrac{2x^2 - 2}{x^2 - x - 2}$.

3. [8 points] Given the following graph:



(a) Find all vertical asymptotes (if any):

(b) Find all horizontal asymptotes (if any):

4. [17 points] Given the function $f(x) = \dfrac{x^2 - 9}{x^2 - 4}$ determine:

   (a) the domain of f.

   (b) The vertical asymptotes, if any.

   (c) the horizontal asymptotes, if any (show work here to justify your answer).