Test 1 **MA 125-8C** **September 10, 2013**

Name: _____ **Signature:** _____

SHOW ALL YOUR WORK!

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

Part 1

1. [7 points] The function

$$h(u) = \frac{2}{u+1}$$

has a discontinuity at the point $u = -1$. Is this point a removable discontinuity or an infinite discontinuity?

2. [7 points] Evaluate $\lim_{h \to 0} \frac{(1-h)^2 - 1}{h}$

3. [7 points] If $f(x) = x \sin(x^2) + 7$ and $g(x) = \sqrt{x}$ what is the function $f \circ g$?

4. [7 points] Evaluate $\lim_{v\to\infty} \dfrac{\sin(v^2)}{v}$

5. [7 points] Determine the x-values where the following function $y = \dfrac{x^2-1}{x^2+3x-10}$ **fails** to be continuous.

6. [7 points] Use the definition of continuity to evaluate [note that your answer must be a number]

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

Part 2

1. [12 points] Evaluate the following limits:

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

   (b) $\lim_{w \to 0} \dfrac{1 - \cos(w)}{w}$

2. [13 points] Consider the curve

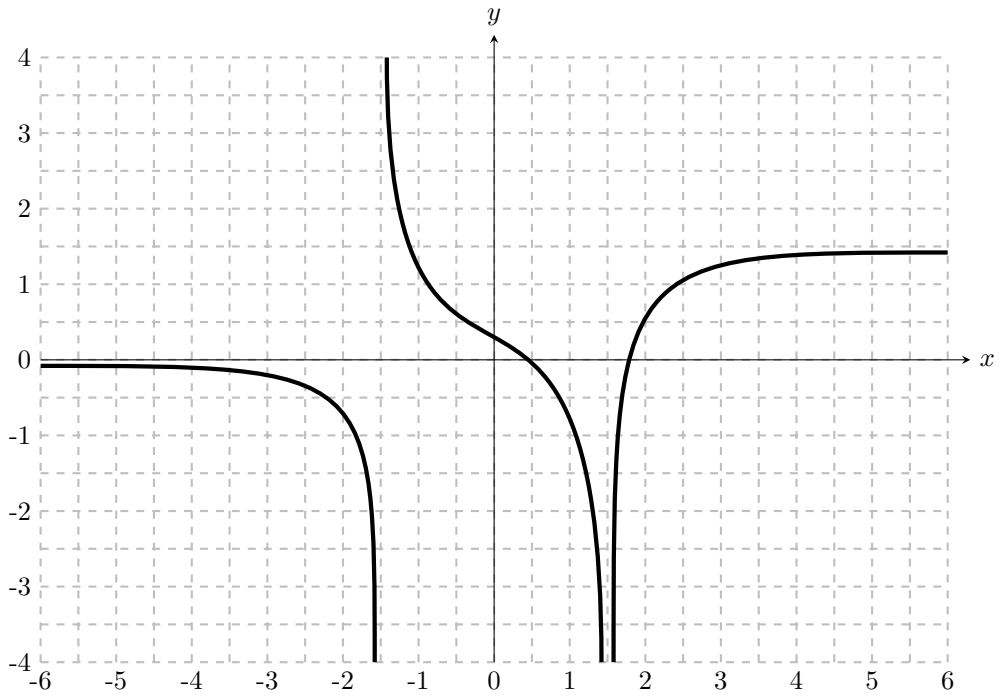
$$y = \frac{4x + 4}{4x - 4}$$

   (a) Find, if any, the horizontal asymptote(s) of this curve. (Justify your answer!)

   (b) Find, if any, the vertical asymptote(s) of this curve. (Justify your answer!)

3. [12 points] Evaluate $\lim_{t \to -5} \dfrac{t^2 - 3t - 40}{t^2 + t - 20}$

4. [8 points] Given the following graph:



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

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

5. [13 points] Consider the function

$$f(x) = \begin{cases} x+1 & \text{for } x < 1 \\ 3 - x^2 & \text{for } x \geq 1 \end{cases}$$

(a) Evaluate

$$\lim_{x \to 1^-} f(x)$$

(b) Evaluate

$$\lim_{x \to 1^+} f(x)$$

(c) Is this function continuous at $x = 1$? (Justify your answer)