27 Sept, 2012
Math 1004G

TEST 1

1. Prove that [7 marks],
$$\frac{1+\cot x}{1+\tan x} = \cot x$$

2. Solve the following limits. If you know $L'Hospital'sRule$, you MAY NOT use it! [4 marks each]:

   (a)
   $$\lim_{x\to 4} \frac{x-4}{x^2-16}$$

   (b)
   $$\lim_{x\to 2} \frac{x+2}{x^2-4}$$

   (c)
   $$\lim_{x\to 0} \frac{x\sin x}{\sin 2x}$$

   (d)
   $$\lim_{x\to -\infty} (x^2+1)^{\frac{1}{2}} - x$$

3. Solve the inequality for x [10 marks]:
$$\left|\frac{x}{x-2}\right| < \frac{1}{2}$$

4. Determine the points of discontinuity for the following functions. If the function is continuous, then prove this [12 marks].

   (a)
   $$f(x) = \csc x$$

   (b)
   $$g(x) = \begin{cases} \frac{x^2+3x-4}{x+4}, \text{ if } x \neq -4 \\ -5, \text{ if } x = -4 \end{cases}$$