MATH206 Homework # 3

Due 27 March 2008

1. Problem 9 (page 103) from the book (6th edition)
   Let C be the arc of the circle |z| = 2 from z = 2 to z = 2i that lies in the first quadrant without evaluating the integral

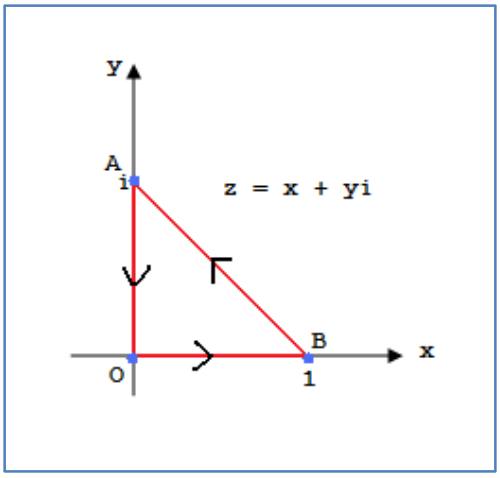
$$\left| \int_C \frac{dz}{z^2 - 1} \right| \leq \frac{\pi}{3}$$

   Finally, find the exact value of the integral using MATLAB.

2. Evaluate the integral

$$\int_C f(z)dz$$

   for the following closed contour. Verify your result using MATLAB.



$$f(z) = y^2 - x + 4xyi$$

3. Find the contour integral

$$\int_C \frac{z^2}{(z-1)^2(z-2)}\,dz$$

Using generalized Cauchy Integral Formula. Verify your result using MATLAB. Please note that you should take an arbitrary contour, which must include the poles "1" and "2".
Hint: You can use partial fraction expansion to apply Cauchy Integral Formula.

4. Map the following region under $w = z^2$ using MATLAB.