Name _____Complex Analysis, Spring 2017, Test 2

Choose FOUR of the problems below to complete for 25 points each. Start each problem at the top of a new sheet/side of paper.

If you have time to complete all 5 problems, note on *this* page which one you want to be a bonus. It will be counted for up to 15 bonus points.

1) Find all the values of $\left|(-i)^{-i}\right|$.

2) This question has three parts. Find all branch points for $f(z) = \ln(z - z^2)$. Define the principle branch of $f(z)$. Illustrate an appropriate branch cut.

3) Find $\int_C \bar{z}\, dz$ where C is given by the cubic $x = y^3$ from (0,0) to (8,2).

4) Find $\int_C \frac{dz}{z^2 - 9}$ where C is the circle given by $|z - 2| = 4$. Be sure that your work justifies your answer.

5) Find $\int_C \frac{\cos(\pi z)}{z^2 - 1}\, dz$ where C is the rectangle with corners at $-i, 2 - i, 2 + i,$ and i. Be sure that your work justifies your answer.