

Math 121A, Midterm #2. 2 April 2003. J. Strain
 Choose 3 of 4 problems:

1. Let $x^2u - y^2v = 1$ and $x + y = uv$.

Find $\left(\frac{\partial y}{\partial u}\right)_v$ and $\left(\frac{\partial y}{\partial v}\right)_x$.

2. Find the shortest distance from the origin to the line of intersection of the planes

$$2x + y - z = 1 \quad \text{and} \quad x - y + z = 2.$$

3. Let $f(z) = \frac{z^2}{(z - \pi) \sin^2(z)}$. Determine the poles of f , the order of each pole, and the residue at each pole.

4. Evaluate by direct integration the line integral

$$\int_2^{2+i\infty} z e^{iz} dz.$$