Math 251
Answers to Practice Test 2b

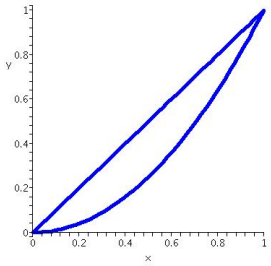
1. 0.

2. $10/\sqrt{3}$.

3. Let $z = f(x, y)$, $x = r\cos\theta$, and $y = r\sin\theta$.
   a) $\dfrac{\partial z}{\partial r} = f_x \cos\theta + f_y \sin\theta$ and $\dfrac{\partial z}{\partial \theta} = -f_x r\cos\theta + f_y r\cos\theta$.
   b) ✓

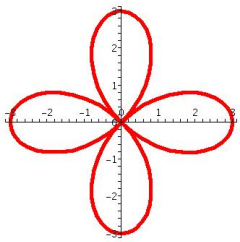
4. The only critical point is (0.0). The second derivative test shows that it is a saddle.

5. The integral is 1/54. The region is shown below.



6. $(0, 16/7)$.

7. [15 points] Area is $9\pi/2$. Graph is below.



8. $\left(0, \frac{1}{4} + \frac{1}{2\pi}\right)$. The integral for M_x is harder than what you would have on a test. Have fun.