

NAME _____

Math 1212
Test 4
Fall 2014

You have 50 minutes to complete this test. You must *show all work* to receive full credit. Work any 6 of the following 7 problems. Clearly **CROSS OUT** the problem you do not wish me to grade. Each problem is worth 16 points, and you get 4 points for free, for a total of 100 points. The answers will be posted on the electronic reserves later today.

1. Find the area of the region bounded by the curves $y = x^3 - 1$ and $y = x - 1$. Be sure to sketch a graph first!

2. Suppose $z = 5x \ln(x^2 + y)$. Compute $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$. Do not simplify.

3. Find and classify the critical points of $f(x, y) = x^3 + y^3 - xy$.

4. The demand functions for two products are given by $D_1 = \frac{100}{p_1 \sqrt{p_2}}$ and

$D_2 = \frac{500}{p_2 \sqrt[3]{p_1}}$, where p_1 and p_2 are the respective prices of the products. Are the

two products competitive, complementary, or neither? (show work, and remember that prices are positive numbers) Give an example of two products that might behave in this way.

5. A computer company has a monthly advertising budget of \$60,000. Its marketing department estimates that if x dollars are spent each month on advertising in newspapers and y dollars per month on television advertising, then the monthly sales will be given by $S = 90x^{\frac{1}{4}}y^{\frac{3}{4}}$ dollars. If the profit is 10% of sales, less the advertising cost, determine how to allocate the advertising budget in order to maximize the monthly *profit*.

6. Solve $\int_{-\infty}^{-2} \frac{1}{(x+1)^3} dx$.

7. Match the level curves with the corresponding surface graphs below:

Surface A matches Level Curve _____
 Surface B matches Level Curve _____
 Surface C matches Level Curve _____

Surface D matches Level Curve _____
 Surface E matches Level Curve _____
 Surface F matches Level Curve _____

