

Math 275-030
July 12, 2007

Exam 3 Name _____

This test consists of 100 points and 7 pages, none of which is intentionally left blank. Take a few seconds right now to be sure you have all the pages. The point value of each question is to the left of the question number. Show all your work in the space provided. If you run out of room for an answer, continue working on the back of the page. Your answers must be justified by your work.

- (15) 1. Make a sketch of the region of integration and evaluate the integral

$$\iint_S x \cos(x + y) \, dA$$

where S is the triangular region whose vertices are $(0, 0)$, $(\pi, 0)$ and (π, π)

- (15) 2. Assuming the given double integral exists, make a sketch of the region of integration and change the order of integration.

$$\int_{-1}^1 \int_{-\sqrt{1-x^2}}^{1-x^2} f(x, y) \, dy \, dx$$

3. A solid is bounded by the graph of $z = x^2 - y^2$, the xy -plane and the planes $x = 1$ and $x = 3$.
- (5) (a) Make a sketch of the solid.

- (10) (b) Compute the volume of the solid by double integration.

- (15) 4. A thin plate is bounded by an arc of the parabola $y = 2x - x^2$ and the interval $0 \leq x \leq 2$. Determine its mass if the density at each point (x, y) is $\rho(x, y) = (1 - y)/(1 + x)$.

- (15) 5. Make a sketch of the region of integration and evaluate the triple integral.

$$\iiint_S xy^2z^3 dV$$

where S is the solid bounded by the surface $z = xy$ and the planes $y = x$, $x = 1$ and $z = 0$.

- (15) 6. Assuming the given triple integral exists, make a sketch of the region of integration and rewrite the triple integral as one or more integrals with the first integration with respect to the variable y .

$$\int_0^1 \int_0^{1-x} \int_0^{x+y} f(x, y, z) dz dy dx$$

- (10) 7. Find the (surface) area of the part of the cone $z^2 = x^2 + y^2$ between the planes $z = 1$ and $z = 2$