

Math 2313, Test III

Name _____

1. Evaluate $\int_0^3 \int_1^2 (6xy) dy dx$

answer: $\frac{81}{2}$

2. A solid cube, with edges of length 2, has a density that is equal to the square of the distance from one corner of the box, that is, $\rho(x, y, z) = x^2 + y^2 + z^2$. What is the mass of the cube? What is its average density?

answer: $M = 32, \rho_{ave} = 4$

3. Evaluate $\int_0^1 \int_y^1 e^{x^2} dx dy$ (Hint: reverse the order of integration)

answer: $(e - 1)/2$

4. Find the volume of the region below the surface $z = 25 - x^2 - y^2$ and above the xy plane. (Hint: convert to polar coordinates)

answer: $625\pi/2$

5. a. Find a such that $p(x, y) = ae^{-x^2-y^2}$ (for all x, y) is a joint probability distribution function. (Hint: $\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$)

answer: $a = 1/\pi$

- b. Given this probability distribution, write an integral (don't evaluate it) which expresses the probability that $x > 3$.

answer: $\int_3^{\infty} \int_{-\infty}^{\infty} p(x, y) dy dx$