

# MATH 2450 RAHMAN EXAM III SAMPLE PROBLEMS

(1) Evaluate the integral  $\iint xy dA$ , over the region enclosed in the first quadrant, outside the circle  $r = 1$  and inside the circle  $r = 2 \cos \theta$ .

(2) Compute  $\iint_R (2x - 3) dA$  where  $R$  is the region enclosed by the curves  $y = x + 4$  and  $y = x^2 - 2x$ .

(3) Integrate

$$\int_{-1}^2 \int_3^6 (2x^2y - 3x) dy dx.$$

(4) Reverse the order of integration to evaluate

$$\int_0^1 \int_{3y}^3 e^{x^2} dx dy.$$

(5) Using cylindrical coordinate find the volume of the region between the paraboloid  $z = 9 - x^2 - y^2$ , the plane  $z = 0$ , and the cylinder  $x^2 + y^2 = 1$ .

(6) Use cylindrical or polar coordinates to find the volume of the region bounded by  $z = 2 - x^2 - y^2$  and  $z = \sqrt{x^2 + y^2}$ .

(7) Find the area in the  $xy$ -plane bounded by  $y = 0$ ,  $x = 0$ ,  $y = 1$ , and  $y = \ln x$ .

(8) Reverse the order and evaluate

$$\int_0^\pi \int_x^\pi \frac{\sin y}{y} dy dx$$

(9) Use a triple integral to find the volume of the solid in the first octant that is bounded by  $x = 0$ ,  $y = 0$ ,  $z = 0$ , and

$$\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1.$$

(10) Reverse the order and evaluate

$$\int_0^2 \int_y^2 e^{x^2} dx dy.$$

(11) Find the area of the region bounded by  $x = y - y^2$  and  $y = -x$ .