Please put problem 1 on answer sheet 1

1. Let \( R \) be the region bounded by the lines \( y = x, \ y = 12 - 2x \) and \( x = 0 \). Evaluate and simplify the integral \( \iint_R x \, dA \). \[20 \text{ pts}\]
   This is the only integral you need to evaluate/simplify!

Please put problem 2 on answer sheet 2

2. (a) Let \( R \) be the region inside \( r = 2 \cos \theta \) and outside \( r = 1 \). Write down an iterated double integral in polar coordinates for \( \iint_R \frac{y}{z} \, dA \). Do not evaluate. \[10 \text{ pts}\]
   (b) Let \( D \) be the solid inside the cylinder \( r = \sin \theta \), above the \( xy \)-plane, and below the paraboloid \( z = 100 - x^2 - y^2 \). Set up an iterated triple integral in cylindrical coordinates for \( \iiint_D z \, dV \). Do not evaluate. \[10 \text{ pts}\]

Please put problem 3 on answer sheet 3

3. (a) Reparametrize the following polar iterated integral as a vertically simple iterated integral. Do not evaluate. \[10 \text{ pts}\]
   \[ \int_{\pi/4}^{\pi/2} \int_0^2 r \cos \theta r \, dr \, d\theta \]
   (b) Let \( D \) be the solid below the cone \( z = \sqrt{x^2 + y^2} \), above the \( xy \)-plane, and inside the cylinder \( x^2 + y^2 = 4 \). Write down an iterated triple integral in spherical coordinates for \( \iiint_D \, x \, dV \). Do not evaluate. \[10 \text{ pts}\]

Please put problem 4 on answer sheet 4

4. (a) Let \( \Sigma \) be the portion of the plane \( y + z = 9 \) inside the cylinder \( x^2 + z^2 = 9 \), Write down a parametrization of \( \Sigma \). \[5 \text{ pts}\]
   (b) Let \( D \) be the solid bounded by the planes \( y = x, y = 2x, y = 6, z = 0 \) and \( z = 10 \). Set up the iterated triple integral in rectangular coordinates for \( \iiint_D z^2 \, dV \). Horizontally simple is best. Do not evaluate. \[15 \text{ pts}\]

Please put problem 5 on answer sheet 5

5. Let \( R \) be the region in the first quadrant bounded by the functions \( y = \frac{1}{2}, \ y = \frac{5}{2}, \ y = \frac{1}{4}x \), and \( y = 3x \). Use a change of variables to convert the integral \( \iint_R y^2 \, dA \) into an iterated double integral over a rectangular region. Do not evaluate. \[20 \text{ pts}\]