

Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has five (5) pages, including this one.
- Enter your answer in the box(es) provided.
- You must show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.
- Credit for each problem is given in parentheses at the right of the problem number.
- No books, notes or calculators may be used on this test.

Page	Max. points	Your points
2	30	
3	25	
4	25	
5	20	
Total	100	

Problem 1 (15 pts). Evaluate $\iint_R y \sin(xy) \, dA$, where $R = [1, 2] \times [0, \pi]$.

Problem 2 (15 pts). Find the volume of the solid S that is bounded by the elliptic paraboloid $x^2 + 2y^2 + z = 16$, the planes $x = 2$ and $y = 2$, and the three coordinate planes.

$V =$

Problem 3 (15 pts). Evaluate the integral $\iint_D \sin(y^2) dA$ where D is the triangle with vertices $(0, 0)$, $(1, 1)$ and $(0, 1)$.

Problem 4 (10 pts). Find the volume of the solid that lies under the paraboloid $z = x^2 + y^2$, above the xy -plane, and inside the cylinder $x^2 + y^2 = 2x$.

$V =$

Problem 5 (10 pts). Evaluate $\iiint_E \sqrt{x^2 + z^2} dV$, where E is the region bounded by the paraboloid $y = x^2 + z^2$ and the plane $y = 4$.

Problem 6 (15 pts). Evaluate $\int_{-2}^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} \int_{\sqrt{x^2+y^2}}^2 (x^2 + y^2) dz dy dx$ by passing the description of the region E in terms of cylindrical coordinates (Trust me, it is **way** easier than evaluating the integral above directly)

Problem 7 (20 pts). A transformation is defined by the equations $x = u^2 - v^2, y = 2uv$.

- (a) Find the image of the square $S = \{(u, v) : 0 \leq u \leq 1, 0 \leq v \leq 1\}$.
- (b) Use the same change of variables to evaluate the integral $\iint_R y \, dA$, where R is the region bounded by the x -axis and the parabolas $y^2 = 4 - 4x$ and $y^2 = 4 + 4x, y \geq 0$.

Image of S :

$\iint_R y \, dA =$