

Name: _____

4-digit code: _____

- Write your name and the last 4 digits of your SSN in the space provided above.
- The test has three (3) pages, including this one.
- The test is fifty (50) minutes long.
- 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	30	
4	40	
Total	100	

Problem 1 (25 pts). Evaluate $\int_{-2}^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} \int_{\sqrt{x^2+y^2}}^2 (x^2 + y^2) dz dy dx$.

Problem 2 (25 pts). Evaluate $\int_E xyz dV$, where E is the solid that lies between the spheres $\rho = 2$, $\rho = 4$ and above the cone $\phi = \pi/3$.

Problem 3 (25 pts). Consider the following change of coordinates:

$$\begin{cases} x &= u^2 - v^2 \\ y &= 2uv \end{cases}$$

Sketch the image under this transformation (in the Cartesian plane), of the rectangle $1 \leq u \leq 2$, $0 \leq v \leq 3$. Show enough work to support your results.

Problem 4 (25 pts). Compute the volume of the ellipsoid

$$\frac{x^2}{25} + \frac{y^2}{16} + \frac{z^2}{100} = 1$$

