

1.(1 pt) Consider the solid that lies above the square $R = [0, 2] \times [0, 2]$ and below the elliptic paraboloid $z = 64 - x^2 - 2y^2$.

(A) Estimate the volume by dividing R into 4 equal squares and choosing the sample points to lie in the lower left hand corners.

(B) Estimate the volume by dividing R into 4 equal squares and choosing the sample points to lie in the upper right hand corners..

(C) What is the average of the two answers from (A) and (B)?

(D) Using iterated integrals, compute the exact value of the volume.

2.(1 pt) Evaluate the iterated integral $\int_0^2 \int_0^4 6x^2y^3 dx dy$

3.(1 pt) Evaluate the iterated integral $\int_2^3 \int_3^4 (1x + y)^{-2} dy dx$

4.(1 pt) Calculate the double integral $\int \int_{\mathbf{R}} (8x + 6y + 48) dA$ where \mathbf{R} is the region: $0 \leq x \leq 3, 0 \leq y \leq 4$.

5.(1 pt) Calculate the double integral $\int \int_{\mathbf{R}} x \cos(2x + y) dA$ where \mathbf{R} is the region: $0 \leq x \leq \frac{2\pi}{6}, 0 \leq y \leq \frac{2\pi}{4}$

6.(1 pt) Calculate the volume under the elliptic paraboloid $z = 4x^2 + 7y^2$ and over the rectangle $R = [-4, 4] \times [-3, 3]$.

7.(1 pt) Using geometry, calculate the volume of the solid under $z = \sqrt{81 - x^2 - y^2}$ and over the circular disk $x^2 + y^2 \leq 81$.

8.(1 pt) Using the maxima and minima of the function, produce upper and lower estimates of the integral

$$I = \iint_{\mathbf{D}} e^{4(x^2+y^2)} dA \text{ where } \mathbf{D} \text{ is the circular disk: } x^2 + y^2 \leq 9.$$

$$\leq I \leq$$

9.(1 pt) Evaluate the iterated integral $I = \int_0^1 \int_{1-x}^{1+x} (15x^2 + 4y) dy dx$

10.(1 pt) Evaluate the double integral $I = \iint_{\mathbf{D}} xy dA$ where \mathbf{D} is the triangular region with vertices $(0, 0), (1, 0), (0, 5)$.

11.(1 pt) Find the volume of the solid bounded by the planes $x = 0, y = 0, z = 0,$ and $x + y + z = 5$.

12.(1 pt) Evaluate the integral by reversing the order of integration.

$$\int_0^1 \int_{4y}^4 e^{x^2} dx dy =$$

13.(1 pt) Match the following integrals with the verbal descriptions of the solids whose volumes they give. Put the letter of the verbal description to the left of the corresponding integral.

- 1. $\int_0^1 \int_{y^2}^{\sqrt{y}} 4x^2 + 3y^2 dx dy$
 - 2. $\int_{-1}^1 \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} 1 - x^2 - y^2 dy dx$
 - 3. $\int_{-2}^2 \int_4^{4+\sqrt{4-x^2}} 4x + 3y dy dx$
 - 4. $\int_0^{\frac{1}{\sqrt{3}}} \int_0^{\frac{1}{2}\sqrt{1-3y^2}} \sqrt{1-4x^2-3y^2} dx dy$
 - 5. $\int_0^2 \int_{-2}^2 \sqrt{4-y^2} dy dx$
- A. Solid under a plane and over one half of a circular disk.
 - B. Solid under an elliptic paraboloid and over a planar region bounded by two parabolas.
 - C. Solid bounded by a circular paraboloid and a plane.
 - D. One eighth of an ellipsoid.
 - E. One half of a cylindrical rod.

14.(1 pt) If $\int_{-5}^{-2} f(x) dx = -5$ and $\int_{-3}^{-2} g(x) dx = 3$, what is the value of $\iint_{\mathbf{D}} f(x)g(y) dA$ where \mathbf{D} is the square: $-5 \leq x \leq -2, -3 \leq y \leq -2$?