

Worksheet: Double and triple integrals!

1. Suppose $A = \{(x, y) \mid 1 \leq x^2 + y^2 \leq 4\}$. Write the double integral as an iterated integral, and evaluate it:

$$\iint_A \sqrt{x^2 + y^2} \, dA =$$

(Hint. Sketch A . You can do the integral in polar coordinates!)

2. The set $E = [0, 1] \times [1, 2] \times [2, 3]$ is a cube. Write the triple integral as an iterated integral, and evaluate it:

$$\iiint_E x + y \, dV =$$

3. A right pyramid R has a base in the x, y plane which is the square $[-1, 1] \times [-1, 1]$, and its tip is at the point $(0, 0, 1)$. Its density increases as one approaches the tip, namely $\rho(x, y, z) = 1 + z$, in mass per volume units. Find the total mass.

4. Find the volume of the sphere of radius one by setting-up either a double or a triple integral, and evaluating it. Of course, the answer you should get is $V = 4\pi/3$.