

TRIPLE INTEGRALS

For each of the following problems write a triple integral and evaluate it.

1. Find the volume of the solid in the first octant bounded above by the plane $x + y + z = 1$ and below by the xy -plane.
2. Find the volume of the solid between $z = x^2 + y^2 + 1$ and $z = -x^2 - y^2 - 1$ where $-1 \leq x \leq 1$ and $-1 \leq y \leq 1$.
3. Evaluate $\iiint_V x e^{xy} dV$ where V is the solid bounded by the planes $x = -1$, $x = 1$, $y = 0$, $y = 2$, $z = 0$, and $z = 3$.
4. Evaluate $\int_5^6 \int_3^4 \int_1^2 \cos(x) \cos(y) \cos(z) dz dy dx$.
5. Use a triple integral to find the volume of the great pyramid of Cheops given that it is 482 feet tall and has a square base that is 754 feet on each side. (HINT: Take advantage of symmetry.)