DEPARTMENT OF MATHEMATICS

MATH2000
Triple Integrals in Rectangular Coordinates

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(1) (Stewart ed. 6, p1034, Q9) Evaluate $\iiint_D 2x \; dV$ where
$D = \left\{(x, y, z) \mid 0 \leq y \leq 2, \; 0 \leq x \leq \sqrt{4 - y^2}, \; 0 \leq z \leq y\right\}$

(2) (Stewart ed. 6, p1034, Q11) Evaluate $\iiint_D 6xy \; dV$ where D lies under the plane $z = 1 + x + y$ and above the region in the x-y plane bounded by the curves $y = \sqrt{x}$, $y = 0$ and $x = 1$.

(3) (Stewart ed. 6, p1034, Q12) Evaluate $\iiint_D y \; dV$ where D is bounded by the planes $x = 0$, $y = 0$, $z = 0$ and $2x + 2y + z = 4$.

(4) Evaluate $\iiint_D xz \; dV$ where D is the solid tetrahedron with vertices $(0, 0, 0)$, $(0, 1, 0)$, $(1, 1, 0)$, $(0, 1, 1)$.

(5) (Stewart ed. 5, p1035, Q36) Write the five other integrals that are equal to the given iterated integral.

$$\int_0^1 \int_0^{x^2} \int_0^y f(x, y, z) \; dz \; dy \; dx.$$