

p.1062 (13.5)

Evaluate the triple integral $\iiint_Q f(x, y, z) dV$.

5. $f(x, y, z) = 2x + y - z$, $Q = \{(x, y, z) \mid 0 \leq x \leq 2, -2 \leq y \leq 2, 0 \leq z \leq 2\}$
7. $f(x, y, z) = \sqrt{y} - 3z^2$, $Q = \{(x, y, z) \mid 2 \leq x \leq 3, 0 \leq y \leq 1, -1 \leq z \leq 1\}$
9. $f(x, y, z) = 4yz$, Q is the tetrahedron bounded by $x + 2y + z = 2$ and the coordinate planes
11. $f(x, y, z) = 3y^2 - 2z$, Q is the tetrahedron bounded by $3x + 2y - z = 6$ and the coordinate planes
13. $f(x, y, z) = 2xy$, Q is bounded by $z = 1 - x^2 - y^2$ and $z = 0$
15. $f(x, y, z) = (x^2 + z^2)y^2$, Q is bounded by $x^2 + z^2 = 4$, $y = -2$ and $y = 2$

Compute the volume of the solid bounded by the given surfaces.

21. $z = x^2$, $z = 1$, $y = 0$ and $y = 2$
23. $z = 1 - y^2$, $z = 0$, $z = 4 - 2x$, $x = 4$
25. $x = y^2 + z^2$, $x = 4$
29. $y = 4 - x^2$, $z = 0$, $z - y = 6$

Find the mass and center of mass of the solid with density $\rho(x, y, z)$ and the given shape.

33. $\rho(x, y, z) = 4$, solid bounded by $z = x^2 + y^2$, $z = 4$
34. $\rho(x, y, z) = 2 + x$, solid bounded by $z = x^2 + y^2$, $z = 4$
35. $\rho(x, y, z) = 10 + x$, tetrahedron bounded by $x + 3y + z = 6$ and the coordinate planes
36. $\rho(x, y, z) = 1 + x$, tetrahedron bounded by $2x + y + 4z = 4$ and the coordinate planes

Sketch the solid whose volume is given and rewrite the iterated integral using a different innermost variable.

41. $\int_0^2 \int_0^{4-2y} \int_0^{4-2y-z} dx dz dy$
43. $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} dz dy dx$
45. $\int_0^2 \int_0^{\sqrt{4-z^2}} \int_{x^2+z^2}^4 dy dx dz$