p.1070 (13.6)

Write the given equation in cylindrical coordinates.

5. $x^2 + y^2 = 16$

9. $z = x^2 + y^2$

13. $y = x$

Set up the triple integral $\iiint_Q f(x,y,z)dV$ in cylindrical coordinates.

15. Q is the region above $z = \sqrt{x^2 + y^2}$ and below $z = \sqrt{8 - x^2 - y^2}$.

17. Q is the region above the xy-plane and below $z = 9 - x^2 - y^2$.

19. Q is the region above $z = x^2 + y^2$ and below $z = 4$.

21. Q is the region bounded by $y = 4 - x^2 - z^2$ and $y = 0$.

23. Q is the region bounded by $x = y^2 + z^2$ and $x = 2 - y^2 - z^2$.

Set up and evaluate the indicated triple integral in the appropriate coordinate system.

25. $\iiint_Q e^{x^2+y^2}dV$, where Q is the region inside $x^2 + y^2 = 4$ and between $z = 1$ and $z = 2$.

27. $\iiint_Q (x+z)dV$, where Q is the region inside $x + 2y + 3z = 6$ in the first octant.

29. $\iiint_Q zdV$, where Q is the region between $z = \sqrt{x^2 + y^2}$ and $z = \sqrt{4 - x^2 - y^2}$.

31. $\iiint_Q (x+y)dV$, where Q is the tetrahedron bounded by $x + 2y + z = 4$ and the coordinate planes.

33. $\iiint_Q e^z dV$, where Q is the region inside $x^2 + y^2 = 9$ and between $z = x^2 + y^2$ and $z = 0$.

35. $\iiint_Q 2xdV$, where Q is the region between $z = \sqrt{x^2 + y^2}$ and $z = 0$ and inside $x^2 + (y-1)^2 = 1$.

Evaluate the iterated integral after changing coordinate system.

37. $\int_{-1}^{1} \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} \int_{0}^{\sqrt{x^2+y^2}} 3z^2 dzdydx$

39. $\int_{0}^{2} \int_{-\sqrt{4-y^2}}^{\sqrt{4-y^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{8-x^2-y^2}} 2dzdxdy$

Sketch the graphs of the cylindrical equations.

43. $z = r$

45. $z = 4 - r^2$

47. $r = 2\sec\theta$

49. $\theta = \dfrac{\pi}{4}$

Find the mass and center of mass of the solid with the given density and bounded by the graphs of the indicated equations.

51. $\rho(x, y, z) = \sqrt{x^2 + y^2}$, bounded by $z = \sqrt{x^2 + y^2}$ and $z = 4$.

53. $\rho(x, y, z) = 4$, between $z = x^2 + y^2$ and $z = 4$ and $x^2 + (y - 1)^2 = 1$.