p. 1164 (14.6)

Find the parametric representation of the surface.

5. $z = 3x + 4y$

7. $x^2 + y^2 - z^2 = 1$

9. The portion of $x^2 + y^2 = 4$ from $z = 0$ to $z = 2$.

11. The portion of $z = 4 - x^2 - y^2$ above the *xy*-plane.

Sketch a graph of the parametric surfaces.

13. $x = u,\ y = v,\ z = u^2 + 2v^2$

15. $x = u\cos v,\ y = u\sin v,\ z = u^2$

17. $x = u,\ y = \sin u\cos v,\ z = \sin u\sin v$

19. $x = 2\sin u\cos v,\ y = 2\sin u\sin v,\ z = 2\cos u$

21. (Problem in book)

Find the surface area of the given surface.

23. The portion of the cone $z = \sqrt{x^2 + y^2}$ below the plane $z = 4$

25. The portion of the plane $3x + 2y + z = 6$ inside the cylinder $x^2 + y^2 = 4$

27. The portion of the cone $z = \sqrt{x^2 + y^2}$ above the triangle with vertices (0,0), (1,0) and (1,1)

29. The portion of the hemisphere $z = \sqrt{4 - x^2 - y^2}$ above the plane $z = 1$

Set up a double integral and evaluate the surface integral $\iint_S g(x, y, z)\,dS$.

31. $\iint_S x\ dS, S$ is the portion of the plane $z = 2x + 3y$ above the rectangle $1 \le x \le 2,$ $1 \le y \le 3$

33. $\iint_S (x + y)dS,\ S$ is the portion of the paraboloid $z = x^2 + y^2$ below $z = 4$

35. $\iint_S (x^2 + y^2)dS,\ S$ is the portion of the paraboloid $z = 4 - x^2 - y^2$ above the *xy*-plane

37. $\iint_S z\ dS,\ S$ is the portion of the cone $z = \sqrt{x^2 + y^2}$ below the plane $z = 4$

Evaluate the flux integral $\iint_S \vec{F} \cdot \vec{n} dS$.

41. $\vec{F} = \langle x, y, z \rangle$, S is the portion of $z = 4 - x^2 - y^2$ above the xy-plane ($\vec{n}$ upward)

43. $\vec{F} = \langle y, -x, z \rangle$, S is the portion of $z = \sqrt{x^2 + y^2}$ below $z = 3$ ($\vec{n}$ downward)

67. Explain the following result geometrically. The flux integral of $\vec{F}(x, y, z) = \langle x, y, z \rangle$ across the cone $z = \sqrt{x^2 + y^2}$ is 0.