

15.4

1.
$$\int_0^{2\pi} \int_0^{\sqrt{2}} r^2 dr d\theta = \frac{4\sqrt{2}}{3}$$

5.
$$\int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} \int_{\frac{1}{2\sin\theta}}^1 \sin\theta dr d\theta = \sqrt{3} - \frac{\pi}{3}$$

9.
$$\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \int_0^1 r^2 \cos\theta dr d\theta = \frac{1-\sqrt{3}}{3}$$

19.
$$\int_0^{\frac{\pi}{2}} \int_0^1 \frac{1}{\sin\theta + \cos\theta} r^2 (\cos\theta - \sin\theta) dr d\theta = 0$$

27.
$$\int_0^{2\pi} \int_0^3 \int_0^5 r^3 dz dr d\theta = \frac{405\pi}{2}$$

31.
$$\int_0^{2\pi} \int_0^3 \int_{r^2}^9 r z dz dr d\theta = 243\pi$$

47.
$$\int_0^{\pi} \int_0^{2\pi} \int_0^1 \rho^4 (\sin\varphi)^3 d\rho d\theta d\varphi = \frac{8\pi}{15}$$

51.
$$\int_0^{\frac{\pi}{2}} \int_0^{\frac{\pi}{3}} \int_1^2 \rho^3 \cos\varphi \sin\varphi d\rho d\theta d\varphi = \frac{5\pi}{8}$$