

Partial solutions for 1 4 15 17 18 21 22 16 20

1. $(2, 2\sqrt{3}, -2), (0, -2, 1)$

4. $(2, 3\pi/4, 1), (2\sqrt{2}, \pi/4, 2)$

15. $\int_{-\pi/2}^{\pi/2} \int_0^2 \int_0^{r^2} r \, dz \, dr \, d\theta = 4\pi$

17. $\int_0^{2\pi} \int_0^4 \int_{-5}^4 \sqrt{r^2} r \, dz \, dr \, d\theta = 384\pi$

18. $\int_0^{2\pi} \int_0^2 \int_{r^2}^4 zr \, dz \, dr \, d\theta = 64\pi/3$

21. $\int_0^{2\pi} \int_0^1 \int_0^{2r} r^2 \cos^2 \theta r \, dz \, dr \, d\theta = 2\pi/5$

22. $\int_0^{2\pi} \int_0^1 \int_{-\sqrt{4-r^2}}^{\sqrt{4-r^2}} r \, dz \, dr \, d\theta = 4\pi/3 \cdot (8 - 3^{3/2})$

16. $\int_0^2 \int_0^{2\pi} \int_0^r r \, dz \, d\theta \, dr = \frac{16\pi}{3}$

20. $-\frac{255}{4}\pi$