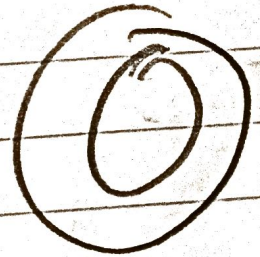
Fayed Rizq 12/13/20

17.3 # 1, 3, 5, 7, 11, 15

1. $\int_0^4 \int_0^2 \int_0^3 0 \, dz \, dy \, dx$ $div(F) = 0$



5.

$$\int_0^{2\pi}\int_0^{1}\int_0^{\sqrt{1-r^2}} z^2 r \, dz\, dr\, d\theta$$

$$\int_0^1 \frac{1}{3}(1-r^2)^{\frac{3}{2}} r \, dr$$

$$\int_0^1 \frac{r}{3}-r^3 \, dr$$

$$\frac{r^2}{6}-\frac{r^4}{4}\Big|_0^1 \quad \frac{1}{6}-\frac{1}{4}$$

$$\int_0^{2\pi} \frac{1}{12}\, d\theta \quad \frac{\pi}{6}$$

3.

$$\int_0^{2\pi}\int_0^{2}\int_0^{2} 2 \, dz\, dr\, d\theta$$

$$4\int_0^1 r \, dr$$

$$2r^2\Big|_0^1$$

$$\int_0^{2\pi} 2 \, d\theta$$

4π

7. $\int_0^{2\pi}\int_0^{2}\int_0^{3} r^3 + z^2 r + r^2 \, dz\, dr\, d\theta$ $\frac{2}{3}$

$\int_0^{2} 3r^3 + \frac{9r^2}{2} dr$

$\frac{3r^4}{4} + \frac{9r^3}{6}\Big|_0^2$

$\int_0^{2\pi} \frac{3(2)^4}{4} + \frac{9(8)}{6} d\theta$

$\int_0^{2\pi} \frac{48}{4} + \frac{72}{6} d\theta$

$\int_0^{2\pi} 24 \, d\theta$

48π

11. $\int_0^{\pi}\int_0^{2}\int_0^{r^2} 3r^3 + 3z^2 \cos\theta \, dz\, dr\, d\theta$

$\int_0^{2} r^4 + 6r^3 + 24r \, dr$

$\frac{3r^4}{2} + 12r^2\Big|_0^2$

$\frac{48}{2} + 32$

$\int_0^{\pi} 56 \, d\theta$

56π

13. $\int_0^{2\pi}\int_0^{3}\int_0^{9-r^2} 2 \, dz\,dr\,d\theta$ $\quad \nabla\cdot V(F)=2$

$\int_0^3 18r-2r^3\,dr$

$z=9-r^2$ $\quad 9r^2-\frac{2r^4}{4}\Big|_0^3$

$\int_0^{2\pi} 81-\frac{162}{4}\,d\theta$

$\int_0^{2\pi}\frac{162}{4}\,d\theta$

$\frac{81}{4}\pi$ $\quad \frac{81\pi}{2}$