

12/8/20 17.3 HW

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

1) $F(x, y, z) = \langle z, x, y \rangle$

the box: $[0, 4] \times [0, 2] \times [0, 3]$

$P_x = 0$ $Q_y = 0$ $R_z = 0$

\therefore Thus, $\iiint \text{div}(F) dV = 0$

3) $F(x, y, z) = \langle 2x, 3z, 3y \rangle$ region: $x^2 + y^2 \leq 1$

$0 \leq z \leq 2$

$P_x = 2$

$Q_y = 0$

$R_z = 0$

$\text{div}(F) = 2$

$\iiint_E 2 dV = 4\pi$

5) $F(x, y, z) = \langle 0, 0, \frac{z^3}{3} \rangle$

region: $x^2 + y^2 + z^2 \leq 1$

$P_x = 0$

$Q_y = 0$

$R_z = z^2$

$\iiint_E z^2 = \frac{4\pi}{15}$

7) $F(x, y, z) = \langle xy^2, yz^2, zx^2 \rangle$ region: $x^2 + y^2 \leq 4$ $0 \leq z \leq 3$

$Q P_x = y^2$

$Q_y = z^2$

$R_z = x^2$

$\iiint (x^2 + y^2 + z^2) dV$

≈ 659.463

$$11) F(x, y, z) = \langle x^3, 0, z^3 \rangle \quad x^2 + y^2 + z^2 \leq 4 \quad r=2$$

$$P_x = 3x^2$$

$$x, y, z \geq 0$$

$$Q_y = 0$$

$$R_z = 3z^2$$

$$\iiint_E (3x^2 + 3z^2) dV = 64\pi$$

$$15) F(x, y, z) = \langle x+y, z, z-x \rangle$$

$$z = 9 - x^2 - y^2 \quad r=3$$

$$P_x = 1$$

$$\iiint_E (2) = 81\pi$$

$$Q_y = 0$$

$$R_z = 1$$