13장 3절

1.(a) $2\ln 2(e-1)$

(b) $\frac{17}{4}$

(c) $\frac{2}{3}$

2.(a) $\int_0^1\int_0^1\int_0^{2-x-y} xydzdydx = \int_0^1\int_0^1\int_0^{2-x-y} xydzdxdy = \frac{1}{6}$

(b) $\int_{-1}^1\int_{x^2}^1\int_0^{1+x+y} 5xdzdydx = \int_0^1\int_{-\sqrt{y}}^{\sqrt{y}}\int_0^{1+x+y} 5xdzdxdy = \frac{4}{3}$

(c) $\int_0^1\int_{x-1}^{1-x}\int_{-y}^{x} 6xdzdydx = 1$

3. (a) $\int_0^1\int_0^{2-2x}\int_0^{2-2x-y} 2zdzdydx$

$$= \int_0^2\int_0^{\frac{2-z}{2}}\int_0^{2-2x-z} 2zdydxdz$$

$$= \int_0^1\int_0^{2-2x}\int_0^{2-2x-z} 2zdydzdx = -\frac{4}{3}$$

(b) $\int_{-1}^1\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}}\int_{-x-1}^{y+1} dzdydx = \int_{-1}^1\int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} (x+y+2)dydx$

$= \int_0^{2\pi}\int_0^1 (r\cos\theta + r\sin\theta + 2)rdrd\theta = 2\pi$(13장6절에서 설명)

(c) $\int_{-1}^1\int_0^{1-x^2}\int_0^{x+y+1} xdzdydx = \frac{4}{15}$

(d) $\int_{-1}^0\int_{-x-1}^{x+1}\int_0^1 x^2dzdydx + \int_0^1\int_{x-1}^{-x+1}\int_0^1 x^2dzdydx = \frac{1}{6}+\frac{1}{6} = \frac{1}{3}$

$i.e.\ 2\left(\int_{-1}^0\int_{-x-1}^{x+1}\int_0^1 x^2dzdydx\right) = \frac{1}{3}$(대칭성 이용 가능)