27) $2x+y+z=4$ $\qquad$ $x=2$ $(2,0,0)$

$z=4-2x-y$ $\qquad$ $y=4$ $(0,4,0)$

$z=0$, $y=4-2x$

$D=\{(x,y) \mid x\in[0,2] \land y\in[0,4-2x]\}$

$$\int_0^2\int_0^{4-2x} 4-2x-y\,dy\,dx = \int_0^2\left[4y-2xy-\frac{1}{2}y^2\right]_0^{4-2x}dx$$

$$= \int_0^2 4(4-2x)-2x(4-2x)-\frac{1}{2}(4-2x)^2\,dy = \int_0^2 2x^2-8x+8\,dx$$

$$= \frac{2}{3}(2^3)-4(2)^2+8(2) = \frac{2(8)}{3} = \boxed{\frac{16}{3}}$$

31) $x^2+y^2=1$ $\quad$ $y=z$ $\quad$ $x=0$ $\quad$ $z=0$

$y=\sqrt{1-x^2}$ $\qquad$ $D=\{(x,y) \mid x\in[0,1] \land y\in[0,\sqrt{1-x^2}]\}$

if $y=0$ $\quad x^2=1$

$x=\pm 1$

$x=1$

$$\int_0^1\int_0^{\sqrt{1-x^2}} y\,dy\,dx = \int_0^1 \frac{1}{2}y^2\Big]_0^{\sqrt{1-x^2}}dx = \int_0^1 \frac{1}{2}-\frac{1}{2}x^2\,dx$$

$$= \frac{1}{2}x-\frac{1}{6}x^3\Big]_0^1 = \frac{1}{2}-\frac{1}{6} = \boxed{\frac{1}{3}}$$