(2.) $\int_0^3 \frac{y}{x+2}\,dx = y\ln|x+2|\Big]_{x=0}^{x=3} = y\ln 5 - y\ln 2 = y\ln\frac{5}{2}$,

$\int_0^4 \frac{y}{x+2}\,dy = \frac{1}{x+2}\left[\frac{y^2}{2}\right]_{y=0}^{y=4} = \frac{1}{x+2}\left(\frac{16}{2}-0\right) = \frac{8}{x+2}$

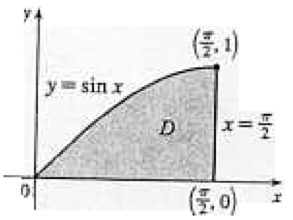
(14.) $\iint_R \frac{1+x^2}{1+y^2}\,dA = \int_0^1\int_0^1 \frac{1+x^2}{1+y^2}\,dy\,dx = \int_0^1 (1+x^2)\,dx \int_0^1 \frac{1}{1+y^2}\,dy$

$= \left[x+\frac{1}{3}x^3\right]_0^1 \left[\tan^{-1} y\right]_0^1 = \left(1+\frac{1}{3}-0\right)\left(\frac{\pi}{4}-0\right) = \frac{\pi}{3}$

(20.) $V = \iint_R (x^2+y^2)\,dA = \int_{-3}^3\int_{-2}^2 (x^2+y^2)\,dx\,dy = \int_{-3}^3 \left[\frac{1}{3}x^3+y^2x\right]_{x=-2}^{x=2}\,dy$

$= \int_{-3}^3 \left[\frac{16}{3}+4y^2\right]dy = \left[\frac{16}{3}y+\frac{4}{3}y^3\right]_{-3}^3 = 2(16+36) = 104$

(30.)



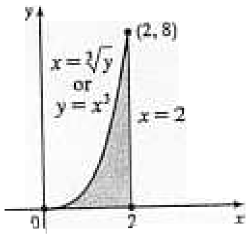
Because the region of integration is

$$D = \{(x,y) \mid 0 \le y \le \sin x,\ 0 \le x \le \tfrac{\pi}{2}\}$$
$$= \{(x,y) \mid \sin^{-1} y \le x \le \tfrac{\pi}{2},\ 0 \le y \le 1\}$$

we have

$$\int_0^{\pi/2}\int_0^{\sin x} f(x,y)\,dy\,dx = \iint_D f(x,y)\,dA$$
$$= \int_0^1\int_{\sin^{-1} y}^{\pi/2} f(x,y)\,dx\,dy$$

(40.)



$$\int_0^8\int_{\sqrt[3]{y}}^2 e^{x^4}\,dx\,dy = \int_0^2\int_0^{x^3} e^{x^4}\,dy\,dx$$
$$= \int_0^2 e^{x^4}\,\left[y\right]_{y=0}^{y=x^3}\,dx$$
$$= \int_0^2 x^3 e^{x^4}\,dx$$
$$= \frac{1}{4}e^{x^4}\Big]_0^2 = \frac{1}{4}(e^{16}-1)$$