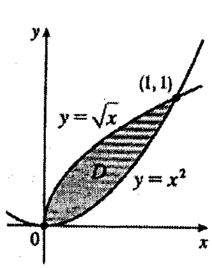
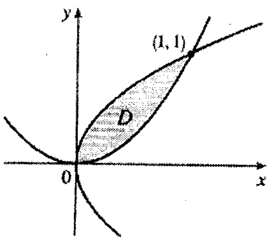
14.



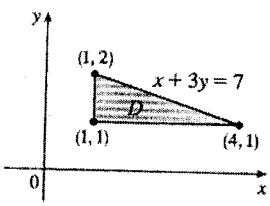
$$\int_0^1 \int_{x^2}^{\sqrt{x}} (x+y)\,dy\,dx = \int_0^1 \left[xy + \tfrac{1}{2}y^2\right]_{y=x^2}^{y=\sqrt{x}} dx$$
$$= \int_0^1 \left(x^{3/2} + \tfrac{1}{2}x - x^3 - \tfrac{1}{2}x^4\right) dx$$
$$= \left[\tfrac{2}{5}x^{5/2} + \tfrac{1}{4}x^2 - \tfrac{1}{4}x^4 - \tfrac{1}{10}x^5\right]_0^1 = \tfrac{3}{10}$$

17.



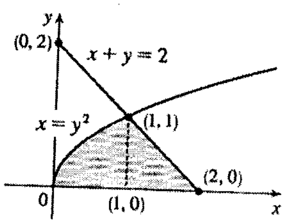
$$V = \int_0^1 \int_{x^2}^{\sqrt{x}} (x^2+y^2)\,dy\,dx = \int_0^1 \left[\left(x^2 y + \frac{y^3}{3}\right)\right]_{y=x^2}^{y=\sqrt{x}} dx$$
$$= \int_0^1 \left(x^{5/2} - x^4 + \tfrac{1}{3}x^{3/2} - \tfrac{1}{3}x^6\right) dx$$
$$= \left[\tfrac{2}{7}x^{7/2} - \tfrac{1}{5}x^5 + \tfrac{2}{15}x^{5/2} - \tfrac{1}{21}x^7\right]_0^1$$
$$= \tfrac{18}{105} = \tfrac{6}{35}$$

19.



$$V = \int_1^2 \int_1^{7-3y} xy\,dx\,dy$$
$$= \int_1^2 \left[\tfrac{1}{2}x^2 y\right]_{x=1}^{x=7-3y} dy$$
$$= \tfrac{1}{2}\int_1^2 (48y - 42y^2 + 9y^3)\,dy$$
$$= \tfrac{1}{2}\left[24y^2 - 14y^3 + \tfrac{9}{4}y^4\right]_1^2 = \frac{31}{8}$$

32.



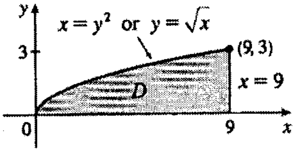
To reverse the order, we must break the region into two separate type I regions. Because the region of integration is

$$D = \{(x,y) \mid y^2 \le x \le 2-y, 0 \le y \le 1\}$$
$$= \{(x,y) \mid 0 \le y \le \sqrt{x}, 0 \le x \le 1\}$$
$$\cup \{0 \le y \le 2-x, 1 \le x \le 2\}$$

we have

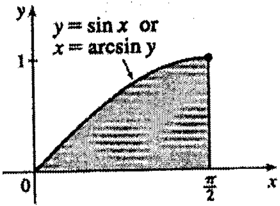
$$\int_0^1 \int_{y^2}^{2-y} f(x,y)\,dx\,dy = \iint_D f(x,y)\,dA$$
$$= \int_0^1 \int_0^{\sqrt{x}} f(x,y)\,dy\,dx + \int_1^2 \int_0^{2-x} f(x,y)\,dy\,dx$$

37.



$$\int_0^3 \int_{y^2}^9 y\cos x^2\,dx\,dy = \int_0^9 \int_0^{\sqrt{x}} y\cos x^2\,dy\,dx$$
$$= \int_0^9 \cos x^2 \left[\frac{y^2}{2}\right]_{y=0}^{y=\sqrt{x}} dx$$
$$= \int_0^9 \tfrac{1}{2}x\cos x^2\,dx = \tfrac{1}{4}\sin x^2\Big]_0^9$$
$$= \tfrac{1}{4}\sin 81$$

39.



$$\int_0^1 \int_{\arcsin y}^{\pi/2} \cos x \sqrt{1+\cos^2 x}\, dx\, dy$$

$$= \int_0^{\pi/2} \int_0^{\sin x} \cos x \sqrt{1+\cos^2 x}\, dy\, dx$$

$$= \int_0^{\pi/2} \cos x \sqrt{1+\cos^2 x}\, \left[y\right]_{y=0}^{y=\sin x}\, dx$$

$$= \int_0^{\pi/2} \cos x \sqrt{1+\cos^2 x}\, \sin x\, dx$$

$$\left[\text{Let } u = \cos x,\ du = -\sin x\, dx,\ dx = du/(-\sin x)\right]$$

$$= \int_1^0 -u\sqrt{1+u^2}\, du = -\tfrac{1}{3}\left(1+u^2\right)^{3/2}\Big]_1^0$$

$$= \tfrac{1}{3}\left(\sqrt{8}-1\right) = \tfrac{1}{3}\left(2\sqrt{2}-1\right)$$