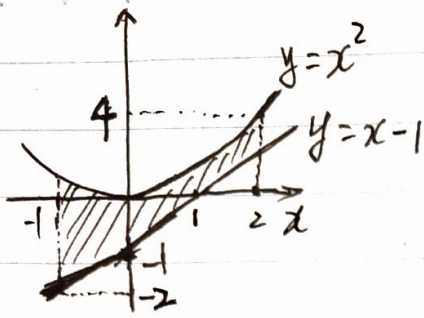
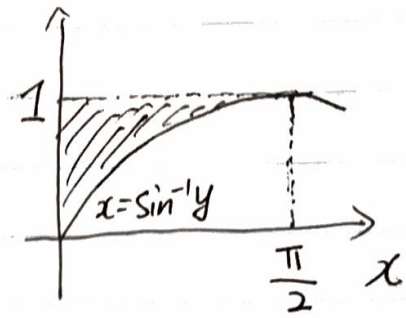


§15.2

2.



7.

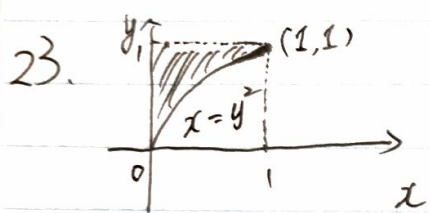


9. (a) $\int_0^2 \int_{x^2}^8 dy dx$

(b) $\int_0^8 \int_0^{y^{1/2}} dx dy$

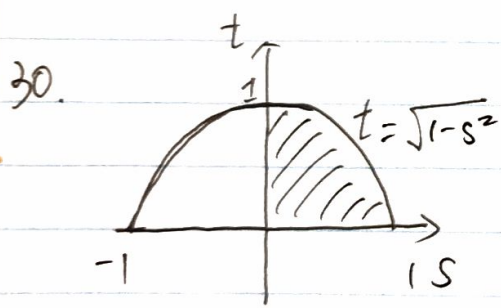
12. (a) $\int_0^2 \int_1^{e^x} dy dx$

(b) $\int_1^{e^2} \int_{\ln y}^2 dx dy$



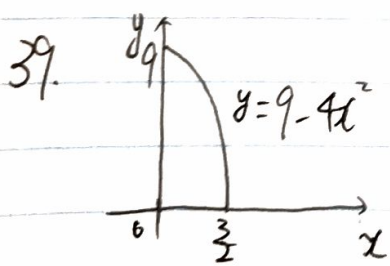
$$\int_0^1 \int_0^{y^2} 3y^3 e^{xy} dx dy = \int_0^1 (3y^2 e^{xy}) \Big|_0^{y^2} dy$$

$$= \int_0^1 (3y^2 e^{y^3} - 3y^2) dy = (e^{y^3} - y^3) \Big|_0^1 = e - 2$$

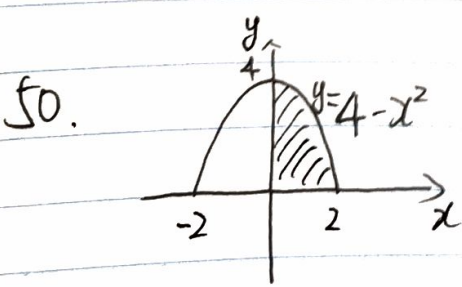


$$\int_0^1 \int_0^{\sqrt{1-s^2}} 8t dt ds = \int_0^1 (4t^2) \Big|_0^{\sqrt{1-s^2}} ds$$

$$= \int_0^1 4(1-s^2) ds = 4(s - \frac{s^3}{3}) \Big|_0^1 = \frac{8}{3}$$



$$\int_0^9 \int_0^{\frac{1}{2}\sqrt{9-y}} 16x dx dy$$



$$\int_0^2 \int_0^{4-x^2} \frac{x e^{2y}}{4-y} dy dx = \int_0^4 \int_0^{\sqrt{4-y}} \frac{x e^{2y}}{4-y} dx dy$$

$$= \int_0^4 \left(\frac{x^2 e^{2y}}{2(4-y)} \right) \Big|_0^{\sqrt{4-y}} dy = \int_0^4 \frac{e^{2y}}{2} dy = \left(\frac{e^{2y}}{4} \right) \Big|_0^4 = \frac{e^8 - 1}{4}$$

$$60. V = \int_0^2 \int_0^{\sqrt{4-x^2}} (3-y) dy dx = \int_0^2 \left(3y - \frac{y^2}{2} \right) \Big|_0^{\sqrt{4-x^2}} dx = \int_0^2 \left(3\sqrt{4-x^2} - \frac{4-x^2}{2} \right) dx$$

$$= \frac{3}{2} x \sqrt{4-x^2} + 6 \sin^{-1} \left(\frac{x}{2} \right) - 2x + \frac{x^3}{6} \Big|_0^2 = 6 \left(\frac{\pi}{2} \right) - 4 + \frac{8}{6} = 3\pi - \frac{16}{6} = \frac{9\pi - 8}{3}$$

$$77. V = \int_0^1 \int_x^{2-x} x^2 + y^2 dy dx = \int_0^1 \left(x^2 y + \frac{y^3}{3} \right) \Big|_x^{2-x} dx$$

$$= \int_0^1 \left(2x^2 - \frac{7x^3}{3} + \frac{(2-x)^3}{3} \right) dx = \left(\frac{2x^3}{3} - \frac{7x^4}{12} - \frac{(2-x)^4}{12} \right) \Big|_0^1$$

$$= \left(\frac{2}{3} - \frac{7}{12} - \frac{1}{12} \right) - (0 - 0 - \frac{16}{12}) = \frac{4}{3}$$

