

$$4 - x^2 = x + 2$$

$$0 = x^2 + x - 2$$

$$0 = (x + 2)(x - 1)$$

$$x = -2, 1$$

a)

$$\int_{-2}^1 [(4 - x^2) - (x + 2)] dx$$

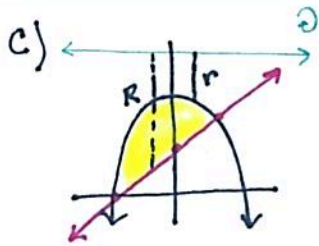
$$4x - \frac{x^3}{3} - \frac{x^2}{2} - 2x \Big|_{-2}^1$$

$$(4 - \frac{1}{3} - \frac{1}{2} - 2) - (-8 + \frac{8}{3} - 2 + 4)$$

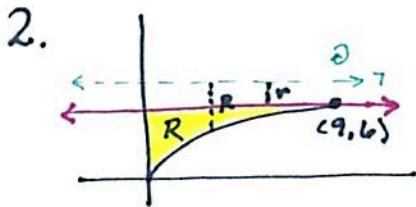
$$= \frac{9}{2}$$

b)

$$\int_{-2}^1 [(4 - x^2) - (x + 2)]^2 dx$$



$$\pi \int_{-1}^2 [6 - (x + 2)]^2 dx - \pi \int_{-1}^2 [6 - (4 - x^2)]^2 dx$$



a)

$$\int_0^9 [6 - 2\sqrt{x}] dx$$

$$6x - \frac{2}{3} \cdot 2x^{3/2} \Big|_0^9 = 54 - \frac{4}{3}(27)$$

$$= 54 - 36 = 18$$

b)

$$\pi \int_0^9 [7 - 2\sqrt{x}]^2 dx - \pi \int_0^9 1^2 dx$$

c)

$$y = 2\sqrt{x}$$

$$\frac{y}{2} = \sqrt{x}$$

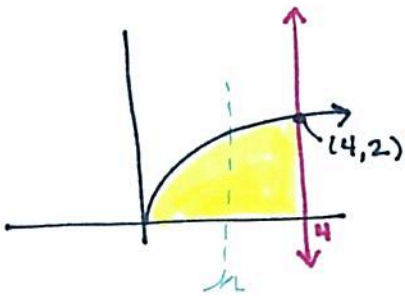
$$x = \frac{y^2}{4}$$

$$\int_0^6 3 \cdot \frac{y^4}{16} dy$$

$$h = 3\Omega$$

$$\Omega = \frac{y^2}{4}$$

3.



$$a) \int_0^4 \sqrt{x} \, dx = \frac{2}{3} x^{3/2} \Big|_0^4$$

$$= \frac{2}{3} (8) - \frac{2}{3} (0) = \frac{16}{3}$$

$$b) \int_0^h \sqrt{x} \, dx = \frac{8}{3}$$

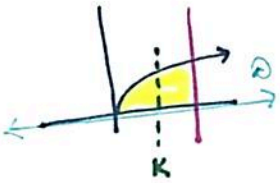
$$\frac{2}{3} x^{3/2} \Big|_0^h = \frac{8}{3}$$

$$\frac{2}{3} h^{3/2} = \frac{8}{3}$$

$$h^{3/2} = 4$$

$$h = (4)^{2/3}$$

c)



$$\pi \int_0^4 (\sqrt{x})^2 \, dx = \pi \cdot \frac{x^2}{2} \Big|_0^4$$

$$= 8\pi$$

d)

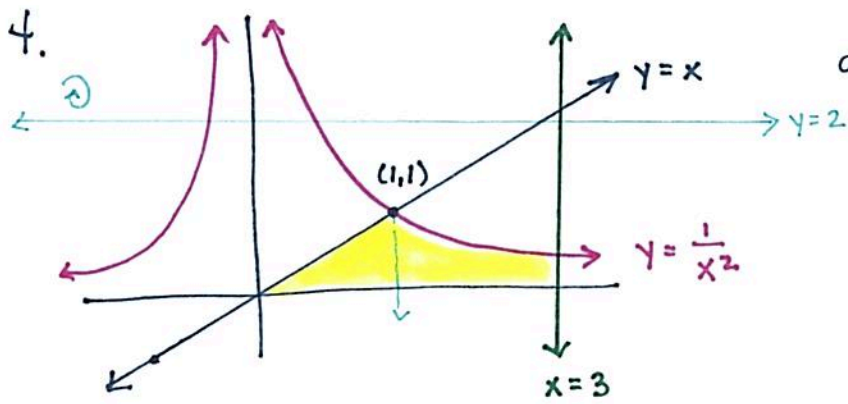
$$\pi \int_0^k x \, dx = 4\pi$$

$$\frac{\pi x^2}{2} \Big|_0^k = 4\pi$$

$$\frac{\pi k^2}{2} = 4\pi$$

$$k^2 = 8$$

$$k = \sqrt{8}$$



$$a) \int_0^1 x dx + \int_1^3 \frac{1}{x^2} dx$$

$$\frac{x^2}{2} \Big|_0^1 + \left(-\frac{1}{x}\right) \Big|_1^3$$

$$\frac{1}{2} + \left(-\frac{1}{3} + 1\right) = \frac{7}{6}$$

$$b) \int_0^1 x \cdot 5x dx + \int_1^3 \frac{1}{x^2} \cdot 5 \cdot \frac{1}{x^2} dx$$

$$\int_0^1 5x^2 dx + \int_1^3 \frac{5}{x^4} dx$$

$$\frac{5x^3}{3} \Big|_0^1 + \left[-\frac{5}{3} \cdot \frac{1}{x^3}\right] \Big|_1^3 = \frac{5}{3} - \frac{5}{81} + \frac{5}{3} = \frac{265}{81}$$

$$c) \pi \int_0^1 [2^2 - (2-x)^2] dx + \pi \int_1^3 [2^2 - (2 - \frac{1}{x^2})^2] dx$$