

Region 1

a. $\int_{-1}^2 x+2-x^2 dx$

$\int_{-1}^2 x+2-x^2 dx$ 4.5

b. $\pi \int_{-1}^2 (x+2)^2 - (x^2)^2 dx$

14.4\pi

c. $\pi \int_{-1}^2 (4-x^2)^2 - (4-(x+2))^2 dx$

21.6\pi

d. $\pi \int_{-1}^2 (x+4)^2 - (x^2+2)^2 dx$

32.4\pi

e. $\int_{-1}^2 (x+2-x^2)^2 dx$

8.1

Region 2

a. $\int_{-1}^2 y+2-y^2 dx$

14.5

b. $\pi \int_{-1}^2 (y+2)^2 - (y^2)^2 dy$

$\frac{72}{5}\pi$

c. $\pi \int_{-1}^2 (4-y^2)^2 - (4-(y+2))^2 dy$

$\frac{108\pi}{5}$

d. $\pi \int_{-1}^2 (7-y^2)^2 - (7-(y+2))^2 dy$

48.6\pi

e. $\int_0^1 \frac{1}{2} \pi \left(\frac{2\sqrt{x}}{2} \right)^2 dx + \int_1^4 \frac{1}{2} \pi \left(\frac{\sqrt{x}-x+2}{2} \right)^2 dx$

$\frac{\pi}{2} \int_0^1 x dx + \frac{\pi}{8} \int_1^4 (\sqrt{x}-x+2)^2 dx$

$\frac{\pi}{4} + \frac{131\pi}{240}$

$\frac{131\pi}{30}$

8.5

Region 3

$$a. \int_{-1}^2 (3x+3) - (x+1)^2 dx$$

4.5

$$c. \pi \int_{-1}^2 (9 - (x+1)^2)^2 - (9 - (3x+3))^2 dx$$

152.681

$$d. \int_{-1}^2 (3x+6)^2 - ((x+1)^2 + 3)^2 dx$$

$\frac{297\pi}{5}$

$$b. \pi \int_{-1}^2 (3x+3)^2 - (x+1)^4 dx$$

32.4π

e. 4.05

Region 4

$$a. \int_0^2 (4x-x^2) - x^2 dx$$

$$\int_0^2 x^2 - 4x + x^2 dx$$

$$\int_0^2 2x^2 - 4x dx$$

$\frac{8}{3}$

$$b. \pi \int_0^2 (x^2)^2 - (4x-x^2)^2 dx$$

$\frac{32\pi}{3}$

$$c. 2\pi \int_0^2 x(x^2 - (4x-x^2)) dx$$

$\frac{16\pi}{3}$

$$d. 2\pi \int_0^2 (x+2)(4x-x^2-x^2) dx$$

$$\rightarrow e. \pi \int_0^2 (6 - (4x-x^2))^2 + (6-x^2)^2 dx$$

-15.73π

$$\rightarrow f. \int_0^2 (x^2 - (4x-x^2)) \left(\frac{2x^2-4x}{2} \right) dx$$

$$4 d) 2\pi \int_0^2 (x+2) (4x-x^2-x^2) dx$$

$$2\pi \int_0^2 (x+2) (4x-2x^2) dx = \boxed{116\pi}$$

$$\pi \int_0^4 (\sqrt{y}+2)^2 - (-\sqrt{4-y}+2+2)^2 dy$$

$$\pi \int_0^4 (\sqrt{y}+2)^2 - (-\sqrt{4-y}+4)^2 dy = \boxed{116\pi}$$

$$e) \pi \int_0^2 (6-x^2)^2 - (6-4x+x^2)^2 dx$$

$$\boxed{21.33\pi}$$

$$f) 2 \int_0^2 (4x-x^2-x^2)^2 dx$$

$$2 \int_0^2 (4x-2x^2)^2 dx$$

$$\boxed{8.533}$$