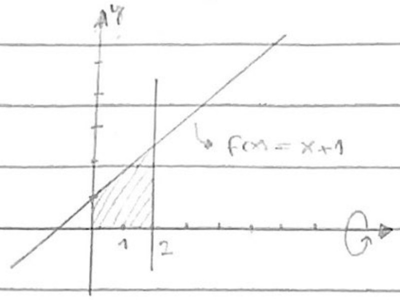
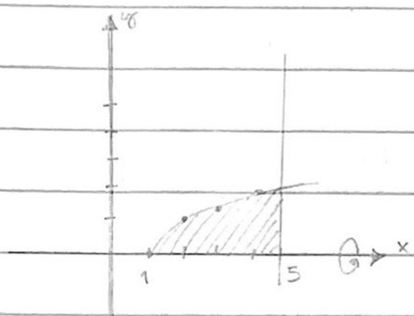
cálculo 2, stewart vol 1, ed. 8, cap 6.2

1



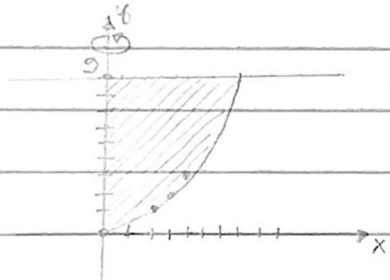
$$V = \int_0^2 \pi \cdot (x+1)^2 \, dx$$
$$= \pi \int_0^2 x^2 + 2x + 1 \, dx$$
$$= \pi \cdot \left(\frac{x^3}{3} + \frac{\cancel{2}x^2}{\cancel{2}} + x \right) \Big|_0^2$$
$$= \pi \cdot \left(\frac{8}{3} + 4 + 2 \right) = \frac{26\pi}{3}$$

3



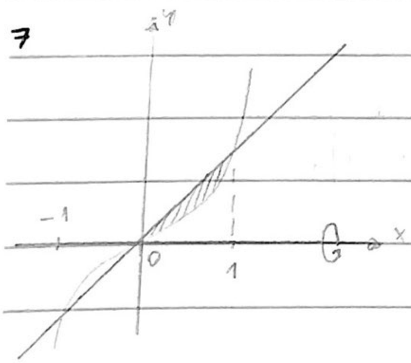
$$V = \int_1^5 \pi \cdot \left(\sqrt{x-1}\right)^2 dx = \pi \int_1^5 x - 1 \, dx$$
$$= \pi \cdot \left(\frac{x^2}{2} - x \right) \Big|_1^5 = \pi \cdot \left(\frac{25}{2} - 5 - \frac{1}{2} + 1 \right)$$
$$= \pi \cdot \left(\frac{24}{2} - 4 \right) = 8\pi$$

5



$$V = \int_0^9 \pi \cdot \left(2\sqrt{y}\right)^2 dy = 4\pi \int_0^9 y \, dy$$
$$= 4\pi \left(\frac{y^2}{2} \right) \Big|_0^9 = 4\pi \cdot \left(\frac{81}{2} \right)$$
$$= 162\pi$$

7

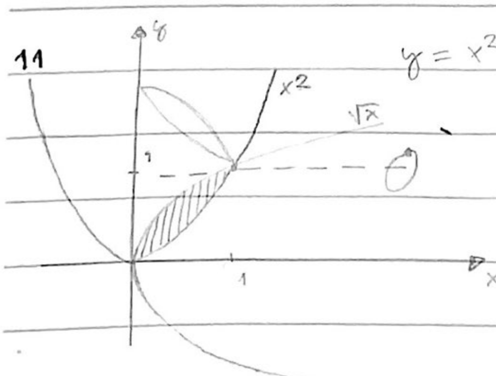


$x^3 = x$ em $1, 0, -1$

$f(x) = x$ — $g(x) = x^3$

$$V = \int_0^1 \pi \cdot x^2 \, dx - \int_0^1 \pi \, x^6 \, dx$$
$$= \frac{\pi}{3} - \frac{\pi}{7} = \frac{4\pi}{21}$$

11



$y = x^2$ e $y = \sqrt{x}$ $\quad$ $x^2 = \sqrt{x}$ em $x = 1$

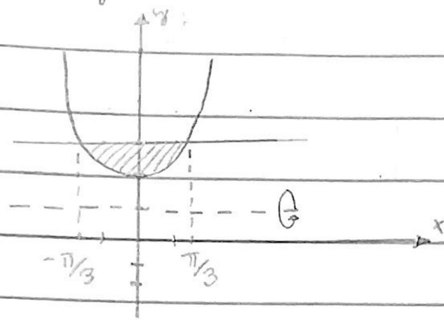
deslocando a função temos

$R \Rightarrow 1 - x^2$

$r \Rightarrow 1 - \sqrt{x}$

$$V = \pi \int_0^1 \left((1-x^2)^2 - (1-\sqrt{x})^2 \right) dx = \frac{11}{30}\pi$$

13 $y = 1 + \sec x$ é equivalente a rotacionar $y = 1 + \sec x - 1$ e $y = 2$ ao redor do eixo x



$\sec x = 2 \to \frac{1}{\cos x} = 2 \to \cos x = \frac{1}{2}$

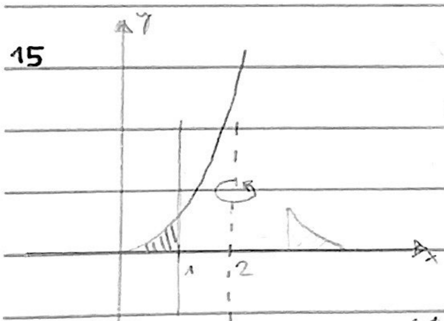
$x = \frac{\pi}{3}$

$$V = \pi \int_{-\pi/3}^{\pi/3} \left((2)^2 - (\sec x)^2\right) dx = \pi \int_{-\pi/3}^{\pi/3} 4 - \sec^2 x \, dx$$

$$= \pi \cdot \left((4x)\Big|_{-\pi/3}^{\pi/3} - (\tan x)\Big|_{-\pi/3}^{\pi/3} \right) = \pi \cdot \left(\frac{8\pi}{3}\right) - \pi \cdot \left(tg\, -\frac{\pi}{3} - tg\, \frac{\pi}{3}\right)$$

$$= \frac{8\pi^2}{3} - \pi \cdot (-\sqrt{3} - \sqrt{3}) = \frac{8\pi^2}{3} + 2\pi\sqrt{3}$$

15



$y = x^3$ $\quad x = 1$, deslocando

$x = \sqrt[3]{y}$

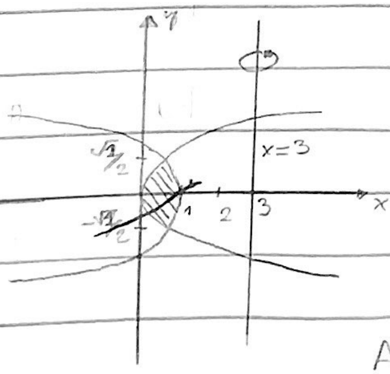
$R \Rightarrow x = 2 - \sqrt[3]{y}$

$r \Rightarrow x = 2 - 1 = 1$

$$V = \int_0^1 \pi\left((2 - \sqrt[3]{y})^2 - (1)^2\right) dy$$

$$= \pi \int_0^1 3 - 4y^{1/3} - y^{2/3} \, dy$$

17



$y^2 = 1 - y^2 \to 2y^2 - 1 = 0$ em $y = \pm\frac{\sqrt{1}}{2}$

deslocando

$R \Rightarrow 3 - (y^2)$

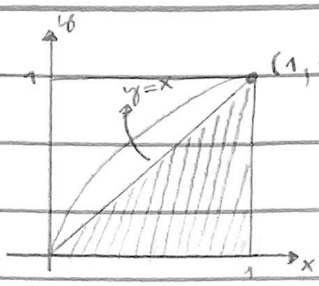
$r \Rightarrow 3 - (1 - y^2) = 2 + y^2$

$$A = \pi \cdot \left((9 - 6y^2 + \cancel{y^4}) - (4 + 4y^2 + \cancel{y^4})\right) = (5 - 10y^2)\pi$$

$$V = \pi \int_{-\sqrt{1}/2}^{\sqrt{1}/2} 5 - 10y^2 \, dy = \frac{5\sqrt[2]{2^3}}{3}\pi = \frac{10\pi\sqrt{2}}{3}$$

tilibra

19



$r = x$

$V = \int_0^1 \pi \cdot x^2 \, dx = \pi \int_0^1 x^2 \, dx$

$= \pi \left(\frac{x^3}{3} \right) \Big|_0^1 = \pi \cdot \frac{1}{3}$

21 raio $= 1 - x$ $\quad y = x$

$= 1 - y$

$V = \int_0^1 \pi (1-y)^2 \, dy = \pi/3$

23 $R \Rightarrow 1$

$r \Rightarrow 1 - \sqrt[4]{x}$ $\quad V = \int_0^1 \pi \left(1 - (\sqrt[4]{x})^2\right) dx = \pi/3$

25 $R \Rightarrow 1$

$r \Rightarrow 1 - x$, como $y = \sqrt[4]{x}$, $x = y^4$

$= 1 - y^4$

$V = \int_0^1 \pi \left(1 - (1-y^4)^2\right) dy = 13\pi/45$

27 $R \Rightarrow \sqrt[4]{x}$

$r \Rightarrow x$ $\quad V = \int_0^1 \pi \cdot \left((\sqrt[4]{x})^2 - x^4\right) dx = \pi/3$

29 $R \Rightarrow 1 - x = 1 - y^4$

$r \Rightarrow 1 - x$, como $y = x$, $1 - y$