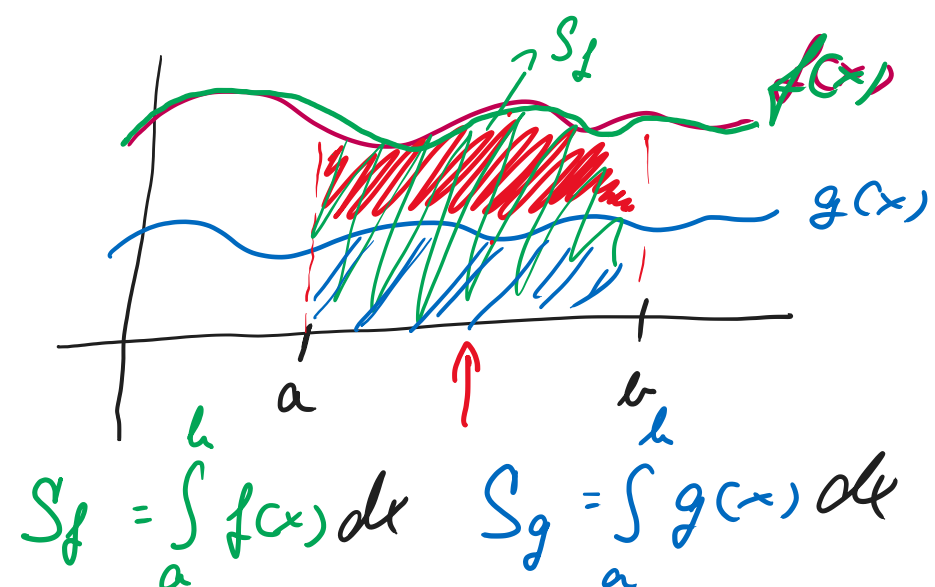
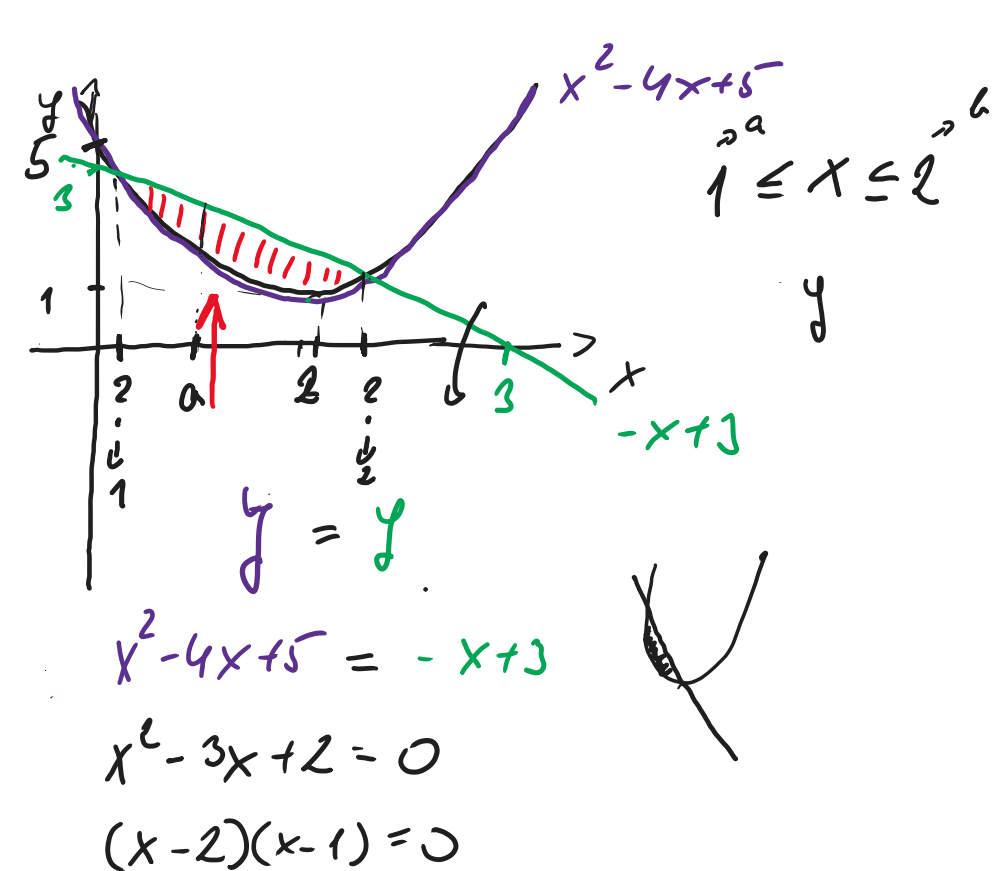


$$S = \int_a^b f(x) dx - \int_a^b g(x) dx = \int_a^b (f(x) - g(x)) dx$$



Pr: $y = x^2 - 4x + 5 = (x-2)^2 + 1 \Rightarrow V[2;1]$
 $y = -x + 3$
 $1 \leq x \leq 2$



$$S = \int_a^b (f(x) - g(x)) dx$$

$$S = \int_1^2 ((-x+3) - (x^2-4x+5)) dx = \int_1^2 (-x+3-x^2+4x-5) dx = \int_1^2 (-x^2+3x-2) dx = \left[-\frac{x^3}{3} + \frac{3x^2}{2} - 2x \right]_1^2 = \left(-\frac{2^3}{3} + \frac{3 \cdot 2^2}{2} - 2 \cdot 2 \right) - \left(-\frac{1^3}{3} + \frac{3 \cdot 1^2}{2} - 2 \cdot 1 \right) = \frac{1}{6}$$

$$V = \pi \int_a^b (f^2(x) - g^2(x)) dx =$$

$$= \pi \int_1^2 ((-x+3)^2 - (x^2-4x+5)^2) dx =$$

$$= \pi \int_1^2 (x^2 - 6x + 9 - (x^4 - 8x^3 + 8x^2 - 20x + 5x^2 - 20x + 25)) dx =$$

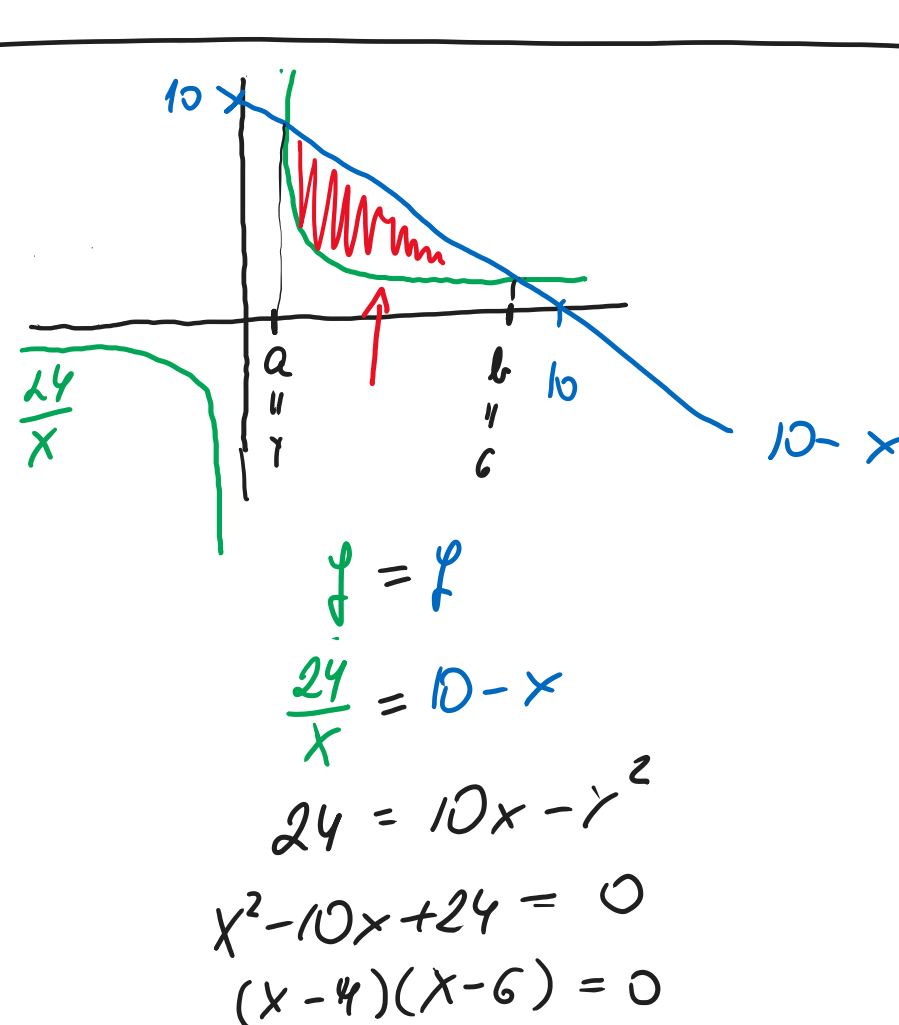
$$= \pi \int_1^2 (-x^4 + 8x^3 - 14x^2 + 34x - 16) dx =$$

$$= \pi \left[-\frac{x^5}{5} + 8 \cdot \frac{x^4}{4} - 14 \cdot \frac{x^3}{3} + \frac{34}{2} x^2 - 16x \right]_1^2 =$$

$$= \pi \left[\left(-\frac{2^5}{5} + 2 \cdot 2^4 - 14 \cdot \frac{2^3}{3} + 17 \cdot 2^2 - 16 \cdot 2 \right) - \left(-\frac{1^5}{5} + 2 \cdot 1^4 - 14 \cdot \frac{1^3}{3} + 17 \cdot 1^2 - 16 \cdot 1 \right) \right]$$

$$= \frac{28\pi}{15}$$

Pr: $y = \frac{24}{x}$
 $y = 10 - x$
 $\frac{24}{4} \leq x \leq 6$
 $\frac{24}{x} \leq y \leq 10 - x$



$$S = \int_a^b (f(x) - g(x)) dx = \int_4^6 \left(10 - x - \frac{24}{x} \right) dx = \left[10x - \frac{x^2}{2} - 24 \ln|x| \right]_4^6 = \left(10 \cdot 6 - \frac{6^2}{2} - 24 \ln 6 \right) - \left(10 \cdot 4 - \frac{4^2}{2} - 24 \ln 4 \right) = 10 + 24 \ln \frac{3}{2}$$

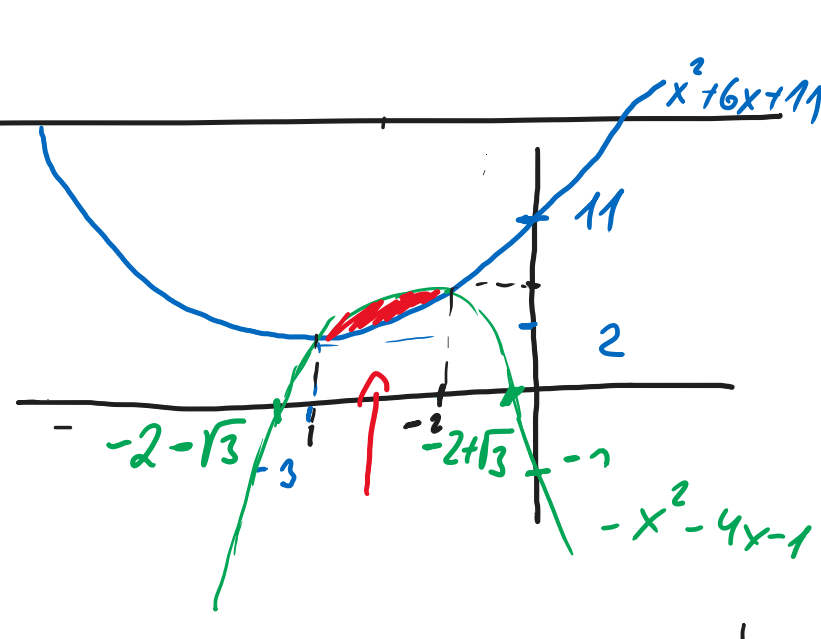
$$V = \pi \int_a^b (f^2(x) - g^2(x)) dx = \pi \int_4^6 \left((10-x)^2 - \left(\frac{24}{x} \right)^2 \right) dx =$$

$$= \pi \int_4^6 \left(100 - 20x + x^2 - \frac{24^2}{x^2} \right) dx = \pi \left[100x - 20 \cdot \frac{x^2}{2} + \frac{x^3}{3} + \frac{576}{x} \right]_4^6 =$$

$$= \pi \left[\left(100 \cdot 6 - 10 \cdot 6^2 + \frac{6^3}{3} + \frac{576}{6} \right) - \left(100 \cdot 4 - 10 \cdot 4^2 + \frac{4^3}{3} + \frac{576}{4} \right) \right] =$$

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

Pr: $y = x^2 + 6x + 11 = (x+3)^2 + 2 \Rightarrow V[-3;2]$
 $y = -x^2 - 4x - 1 \Rightarrow [(x+2)^2 - 3] \Rightarrow V[-2;3]$
 $-3 \leq x \leq -2$



$$S = \int_a^b (f(x) - g(x)) dx =$$

$$S = \int_{-3}^{-2} [(-x^2 - 4x - 1) - (x^2 + 6x + 11)] dx =$$

$$= \int_{-3}^{-2} (-2x^2 - 10x - 12) dx = -2 \int_{-3}^{-2} (x^2 + 5x + 6) dx = -2 \left[\frac{x^3}{3} + \frac{5x^2}{2} + 6x \right]_{-3}^{-2} =$$

$$= -2 \left[\left(\frac{(-2)^3}{3} + \frac{5 \cdot (-2)^2}{2} + 6 \cdot (-2) \right) - \left(\frac{(-3)^3}{3} + \frac{5 \cdot (-3)^2}{2} + 6 \cdot (-3) \right) \right] =$$

$$= -2 \cdot \frac{(-1)}{6} = \frac{1}{3}$$

$$V = \pi \int_a^b (f^2(x) - g^2(x)) dx =$$

$$V = \pi \int_{-3}^{-2} ((-x^2 - 4x - 1)^2 - (x^2 + 6x + 11)^2) dx =$$

$$= \pi \int_{-3}^{-2} (x^4 + 4x^3 + x^2 + 4x^3 + 8x^2 + 4x + 1 - (x^4 + 6x^3 + 11x^2 + 6x^3 + 36x^2 + 66x + 11x^2 + 66x + 121)) dx =$$

$$= \pi \int_{-3}^{-2} (-4x^3 - 40x^2 - 124x - 120) dx = \pi \left[-x^4 - \frac{40x^3}{3} - 62x^2 - 120x \right]_{-3}^{-2} =$$

$$= \pi \left[\left(-(-2)^4 - 40 \cdot \frac{(-2)^3}{3} - 62 \cdot (-2)^2 - 120 \cdot (-2) \right) - \left(-(-3)^4 - 40 \cdot \frac{(-3)^3}{3} - 62 \cdot (-3)^2 - 120 \cdot (-3) \right) \right]$$

$$= \left(\frac{248}{3} - 81 \right) \pi = \frac{5}{3} \pi$$