

$$3. f(x) = \sqrt{\frac{3x-5}{x^2-3x+2}} \quad (x \in [3; 4])$$

$$\exists f \in [a, b] \quad f' \neq 0 \Rightarrow V = \bar{a} \int_a^b f^2(x) dx.$$

$$f \in C[3, 4], \quad f' \neq 0 \Rightarrow$$

$$V = \bar{a} \int_3^4 \left(\sqrt{\frac{3x-5}{x^2-3x+2}} \right)^2 dx$$

$$= \bar{a} \int_3^4 \frac{3x-5}{(x-1)(x-2)} dx$$

$$= \bar{a} (-\ln(2) + 2\ln(3)).$$

$$= -\ln(2)\bar{a} + 2\bar{a}\ln(3)$$

$$\begin{aligned} x & \xrightarrow{x-1} 1 \\ x & \xrightarrow{x-2} 2 \\ (x-1)(x-2) \end{aligned}$$

$$\int f'(x)g(x)dx = f(x) \cdot g(x) - \int f(x) \cdot g'(x)dx$$

$$\frac{1}{(x-1)(x-2)}$$

$$\ln(x-1)(x-2)$$

$$\begin{aligned} (x-2+1) &= (x-1) \ln(3) \\ &= \int_3^4 \frac{1}{(x-1)(x-2+1)} - \int_3^4 \frac{1}{(x-2)(x-2+1)} \\ &= 3(\ln(3) - \ln(2)) \\ &+ 2\ln(2) - \ln(3) \end{aligned}$$

$$\begin{aligned} f' &= x^2 - 3x + 2 = 2x - 3 \\ &= \frac{(2x-3)}{(x-1)(x-2)} \\ &= -\ln(2) + 2\ln(3) \\ &= -\ln(2) + 2\ln(3) \end{aligned}$$