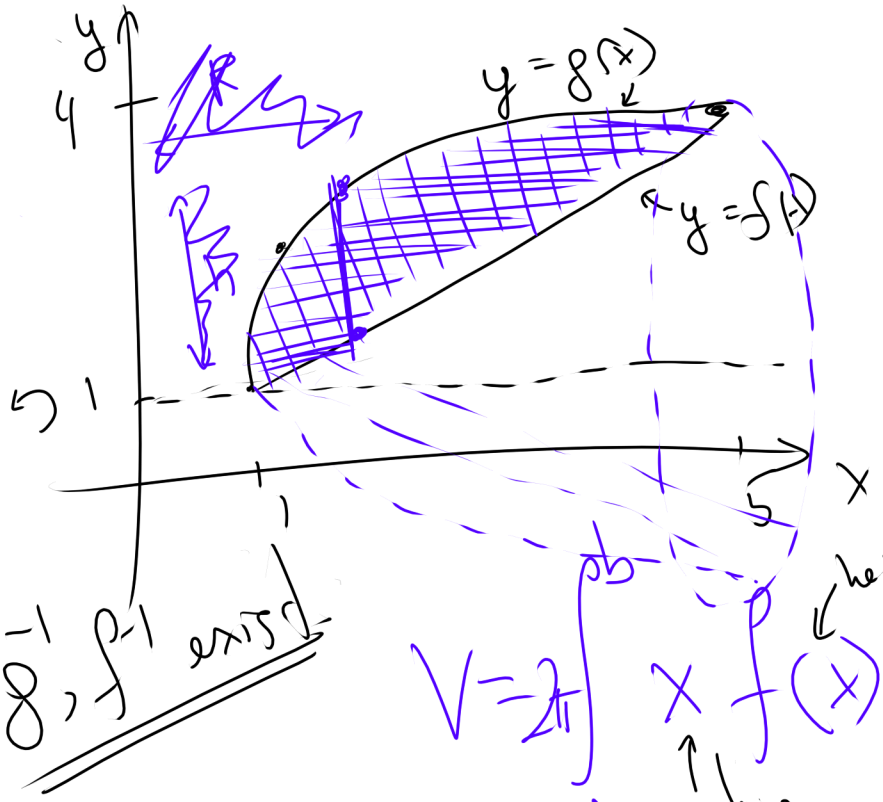


g^{-1}, f^{-1} exist

Easy with washer. We'll do with shell (disc) method.

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

height

radius

← shell

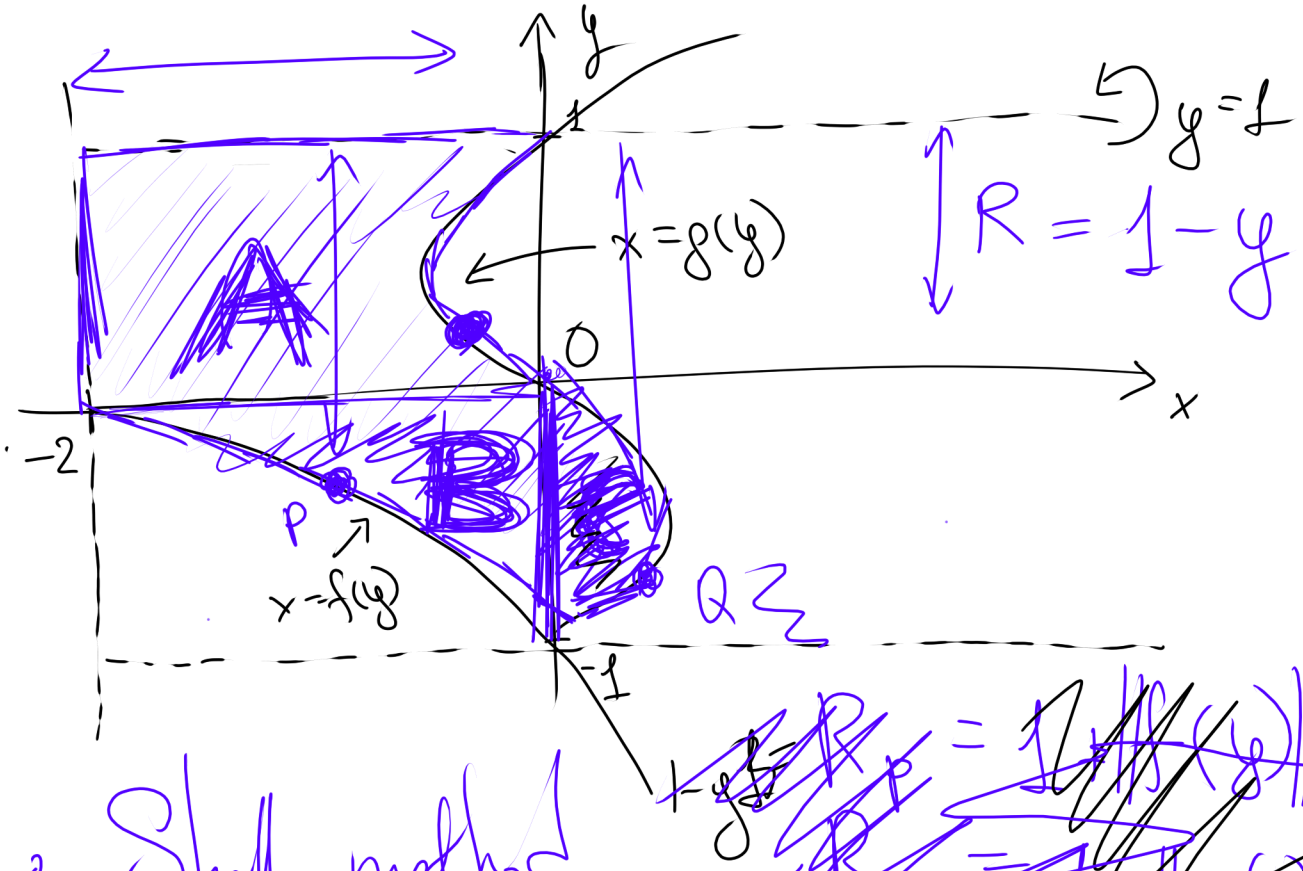
Let us find:

$$h = f^{-1}(y) - g^{-1}(y)$$

$$R = y - 1$$

$$V = 2\pi \int_1^4 (y-1)\left(f^{-1}(y) - g^{-1}(y)\right) dy$$

I



A: Shell method

B: Shell method

Solution

$$h_A = +2 + g(y)$$

$$R_A = 1 - y$$

$$V_A = 2\pi \int_0^1 (1-y)(2+g(y))\,dy$$

$$h_B = g(y) - f(y)$$

$$R_B = 1 - y$$

$$V_B = 2\pi \int_{-1}^{0} (1-y)(g(y) - f(y))\,dy$$

Final Ans:

$$V_{Total} = V_A + V_B$$

II