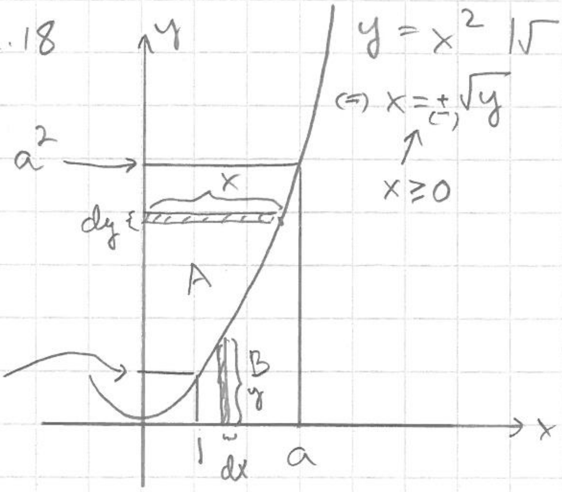
$= \dots = 0{,}533333 \ (m^2)$

Tilavuus: $V = Ah = 0{,}533333 \, m^2 \cdot 450 \, m = \underline{240 \, m^3}$

12.18



$a > 1$

$$B = \int_1^a y \, dx = \int_1^a x^2 dx = \Big/_1^a \tfrac{1}{3}x^3$$

$$= \tfrac{1}{3}a^3 - \tfrac{1}{3}\cdot 1^3 = \tfrac{1}{3}a^3 - \tfrac{1}{3}$$

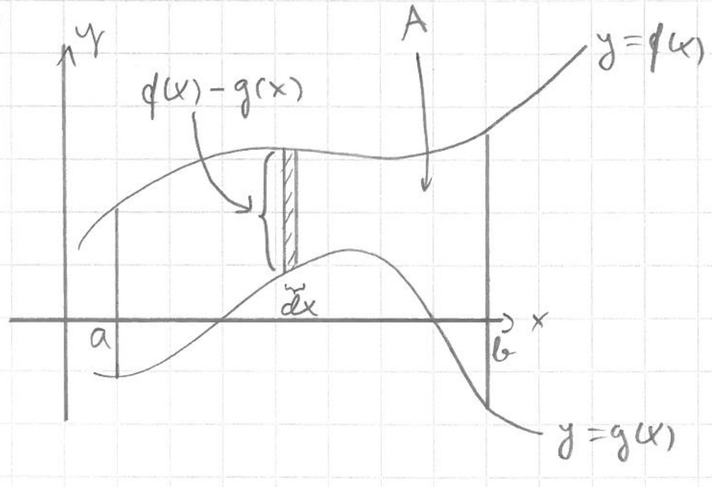
$$A = \int_1^{a^2} x \, dy = \int_1^{a^2} \sqrt{y} \, dy = \int_1^{a^2} y^{\frac{1}{2}} dy$$

$$= \Big/_1^{a^2} \frac{1}{\frac{3}{2}} y^{\frac{3}{2}} = \frac{2}{3}\left((a^2)^{\frac{3}{2}} - 1^{\frac{3}{2}}\right)$$

$$= \frac{2}{3}(a^3 - 1) = 2\underbrace{\left(\tfrac{1}{3}a^3 - \tfrac{1}{3}\right)}_{B} = 2B \ //$$

13. Kahden käyrän välinen alue

1°



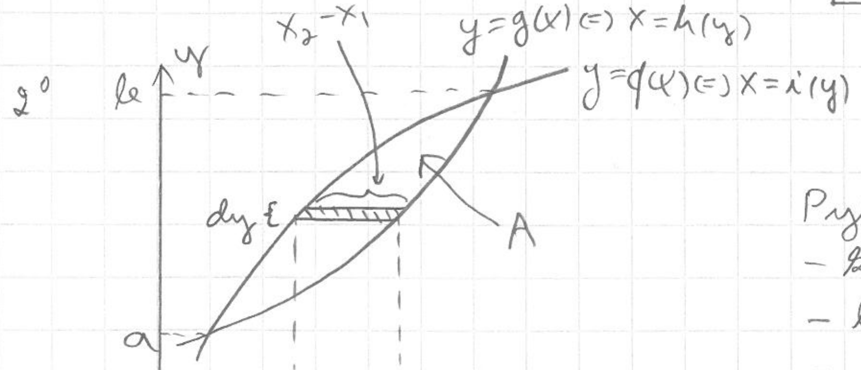
Olkoon $f(x) \geq g(x)$ aina kun $x \in [a, b]$

Pylvään:
- kanta: dx
- korkeus: $f(x) - g(x)$
- pinta-ala: $(f(x) - g(x))\,dx$

$y = g(x) \Rightarrow \boxed{A = \int_a^b (f(x) - g(x))\,dx}$

ylempi alempi

2°



Pylvään:
- kanta: dy
- leveys: $x_2 - x_1 = h(y) - i(y)$
- pinta-ala: $(x_2 - x_1)\,dy = (h(y) - i(y))\,dy$

$$\Rightarrow \boxed{A = \int_a^b (x_2 - x_1)\,dy = \int_a^b (h(y) - i(y))\,dy}$$

oikea vasen