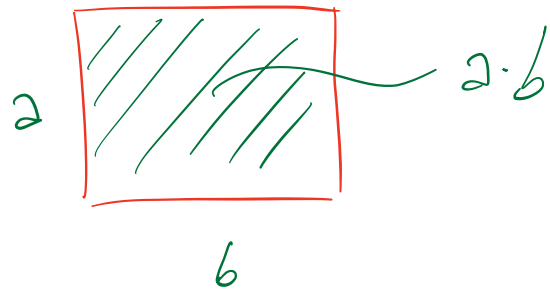
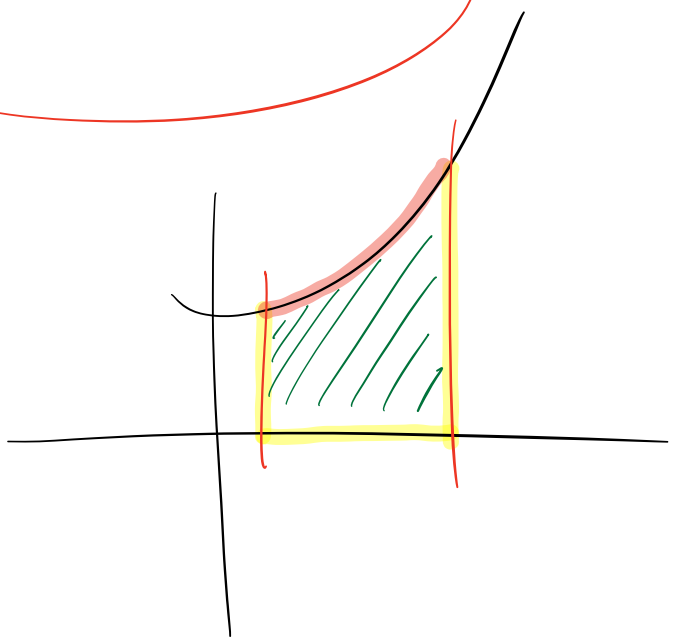
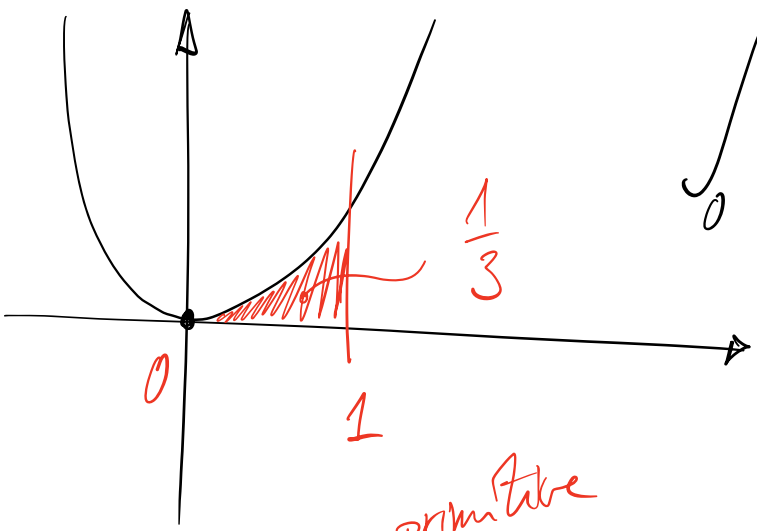
Intégrales définies

Aires & volumes







$$\int_0^1 x^2\,dx = \frac{1}{3}x^3\Big|_0^1$$

$$= \frac{1}{3}1^3 - \frac{1}{3}0^3$$

$$= \frac{1}{3}\cdot 1^3$$

$$= \frac{1}{3}$$

$$\int_a^b f(x)\,dx = \underbrace{F(x)}_{\text{primitive}}\Big|_a^b = F(b) - F(a)$$

si $F' = f$

$$\int_0^1 x^2\,dx = \frac{1}{3}x^3\Big|_2^b = \underbrace{\frac{1}{3}b^3 - \frac{1}{3}2^3}_{\text{результат}}$$

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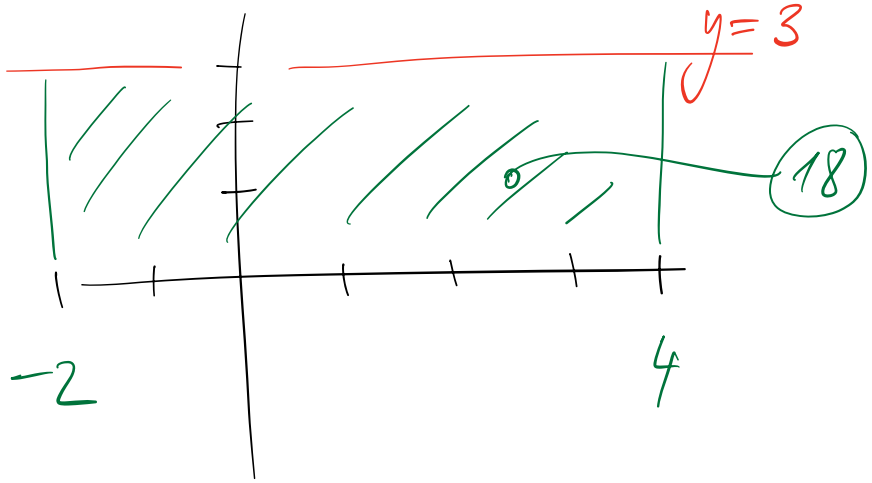
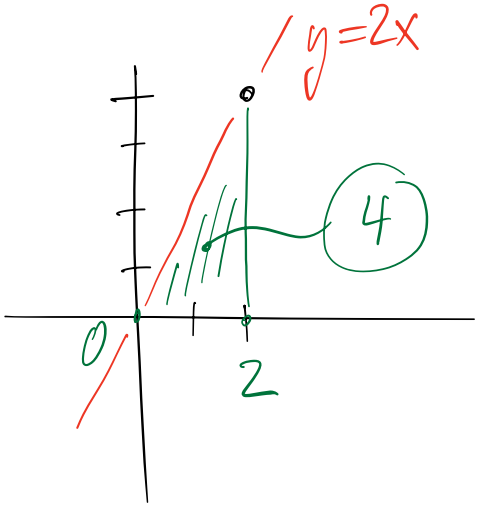
1) $\int_{-2}^{4} 3\,dx$



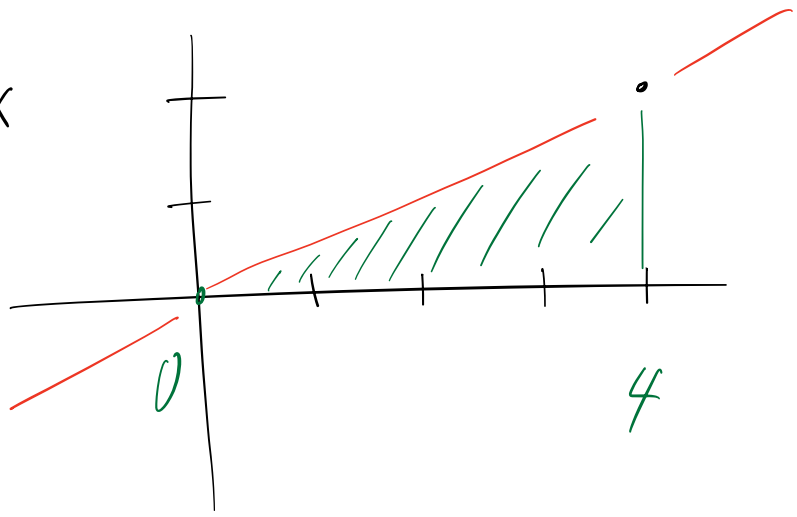
$$\int_{-2}^{4} 3\,dx = 3x\Big|_{-2}^{4} = 3\cdot 4 - 3\cdot(-2) = 12+6 = 18$$

2) $\int_0^2 2x\,dx =$



$$x^2\Big|_0^2 = 2^2 - 0^2 = 4$$

3) $$\int_0^4 \frac{1}{2}x\,dx = \frac{1}{4}\int_0^4 2x\,dx$$



$$= \frac{1}{4}x^2\Big|_0^4$$

$$= \frac{1}{4}\cdot 4^2 - \frac{1}{4}\cdot 0^2 = \frac{16}{4} = 4$$

4) $$\int_2^6 \left(\frac{1}{2}x+1\right)dx = \left(\frac{1}{4}x^2+x\right)\Big|_2^6 = \left(\frac{1}{4}6^2+6\right) - \left(\frac{1}{4}2^2+2\right)$$

$$= 15-3 = 12$$