

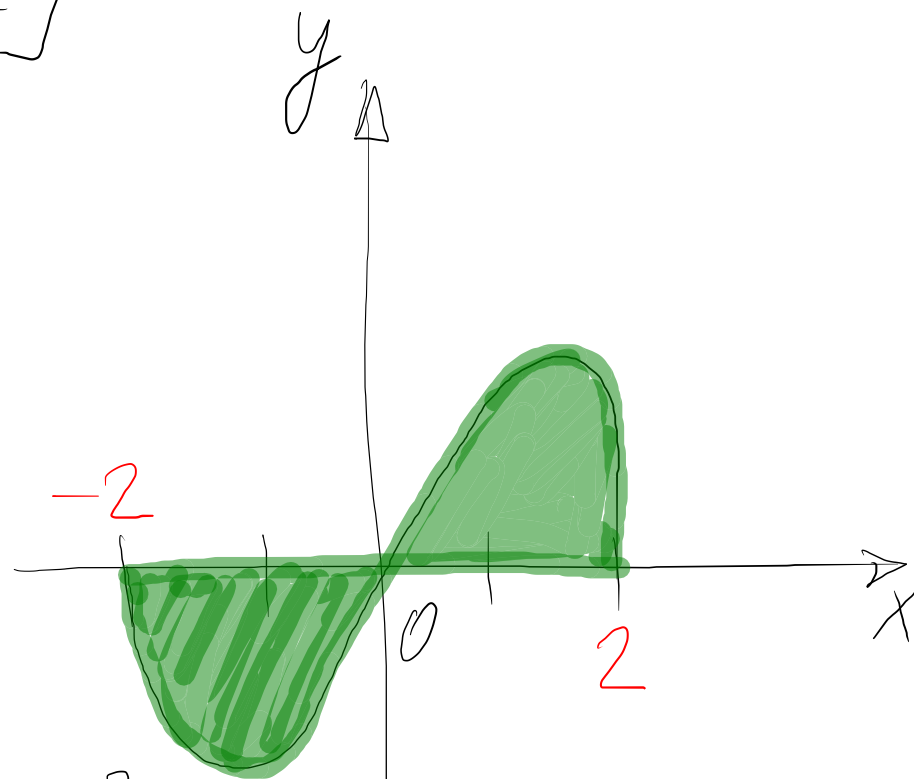
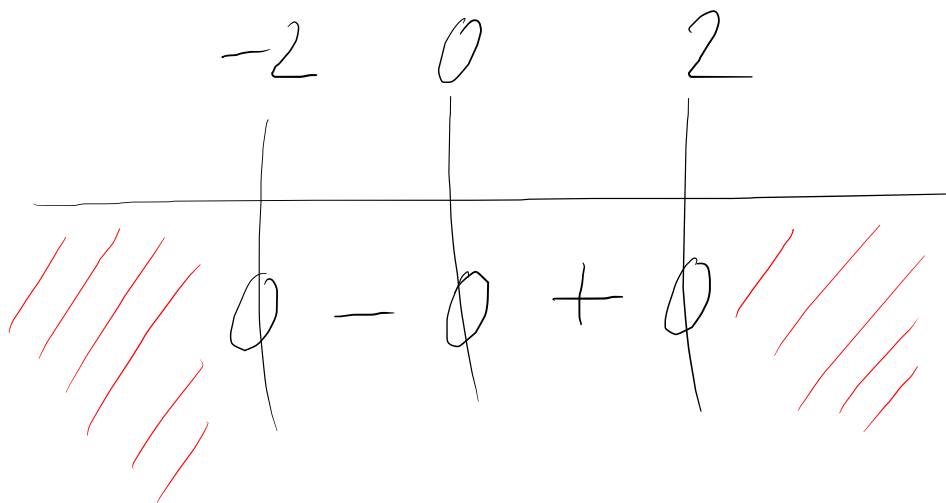
Esquisse du graphe de $f(x) = x\sqrt{4-x^2}$

$$f(x) = 0 \Leftrightarrow x\sqrt{4-x^2} = 0 \Leftrightarrow \begin{array}{l} x=0 \\ 4-x^2=0 \end{array}$$

$$\Leftrightarrow x=0 / (2-x)(2+x) = 0$$

$$\Leftrightarrow x=0 / x=2 / x=-2$$

$$D(x\sqrt{4-x^2}) = [-2; 2]$$



Area: $\left| \int_{-2}^0 x\sqrt{4-x^2} dx \right| + \left| \int_0^2 x\sqrt{4-x^2} dx \right| = 2 \cdot \left| \int_0^2 f(x) dx \right|$

Calcul d'une primitive:

$$\int x \sqrt{4-x^2} dx = -\frac{1}{2} \int \underbrace{(4-x^2)^{1/2}} \cdot \underbrace{(-2x)} dx$$

$(4-x^2)' = -2x$

$$= -\frac{1}{2} \cdot \frac{1}{1+1/2} (4-x^2)^{1+1/2} + C = -\frac{1}{2} \cdot \frac{1}{3/2} \cdot (4-x^2)^{3/2} + C$$

$$= -\frac{1}{2} \cdot \frac{2}{3} (4-x^2)^{3/2} + C = -\frac{1}{3} (4-x^2)^{3/2} + C$$

Calcul de l'aire :

$$A = 2 \int_0^2 f(x) dx = 2 \cdot \left(-\frac{1}{3} (4-x^2)^{3/2} \right) \Big|_0^2$$

$$= 2 \cdot \left(-\frac{1}{3} (4-4)^{3/2} - \left(-\frac{1}{3} (4-0)^{3/2} \right) \right)$$

$$= 2 \cdot \frac{1}{3} \cdot 4^{3/2} = \frac{2}{3} \cdot 2^3 = \frac{16}{3} \Rightarrow A = \frac{16}{3} \approx 5,33$$