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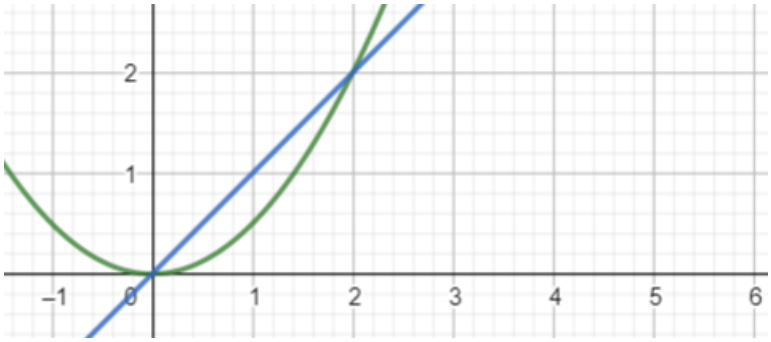
Opgave 404



$$f(x) = \frac{1}{2}x^2$$
$$g(x) = x$$

Find skæringpunkter

$$f(x) = g(x)$$
$$\frac{1}{2}x^2 = x$$
$$\frac{1}{2}x^2 - x = 0$$

$$a = \frac{1}{2}$$
$$b = -1$$
$$c = 0$$

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2}$$

$$x_1 = \frac{-(-1) - \sqrt{(-1)^2 - 4 \cdot \frac{1}{2} \cdot 0}}{2 \cdot \frac{1}{2}}$$
$$x_1 = 0$$

$$x_2 = \frac{-(-1) + \sqrt{(-1)^2 - 4 \cdot \frac{1}{2} \cdot 0}}{2 \cdot \frac{1}{2}}$$
$$x_2 = 2$$

Find areal mellem funktionerne

$$A_1 = \int_0^2 \frac{1}{2}x^2 dx$$
$$A_1 = 1{,}333333$$

$$A_2 = \int_0^2 x\, dx$$
$$A_2 = 2$$

$$A = A_2 - A_1$$
$$A = 2 - 1.33$$
$$A = 0{,}67$$

Find rumfang mellem funktionerne

$$V_1 = \pi \cdot \int_0^2 \left(\frac{1}{2}x^2\right)^2 dx$$
$$V_1 = 5{,}026548$$

$$V_2 = \pi \cdot \int_0^2 x^2 dx$$
$$V_2 = 8{,}37758$$

$$V = V_2 - V_1$$
$$V = 8.377 - 5.026$$
$$V = 3{,}351$$

CAS

$$Define: f(x) = \frac{1}{2}x^2$$
$$Define: g(x) = x$$

$$f(x) = g(x)$$

⇳ *The equation is solved for x by WordMat.*

$$x = 0 \quad \vee \quad x = 2$$

$$A = \int_0^2 g(x) - f(x) dx \approx 0{,}6666667$$
$$V = \pi \int_0^2 g(x)^2 - f(x)^2 dx \approx 3{,}351032$$