

Hausaufgaben 27.03-16 Uhr

a) $f(x) = \frac{1}{2}x^2 - 3x$

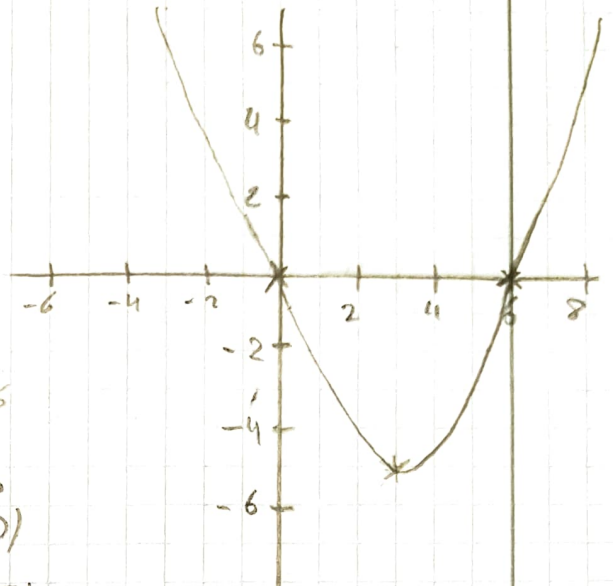
$f(x) = \frac{1}{2}(x^2 - 6x + 0)$

$\frac{6}{2} \pm \sqrt{\left(\frac{-6}{2}\right)^2 + 0}$

$x_1 = 0$

$x_2 = 6$

$$\int_0^6 \left(\frac{1}{2}x^2 - 3x\right) dx \left[\frac{0,5}{3}x^3 - \frac{3}{2}x^2 + C \right]_0^6$$
$$= (36 - 54) - (0 - 0)$$
$$= -18 - 0 = \underline{\underline{-18 \text{ FE}}}$$



b) $f(x) = \frac{1}{2}x^4 + x^3$

$f(x) = \left(\frac{1}{2}x + 1\right) \cdot x^3 = 0$

$f(x) = \frac{1}{2}x + 1 = 0 \quad | -1$

$\frac{1}{2}x = -1 \quad | : \frac{1}{2}$

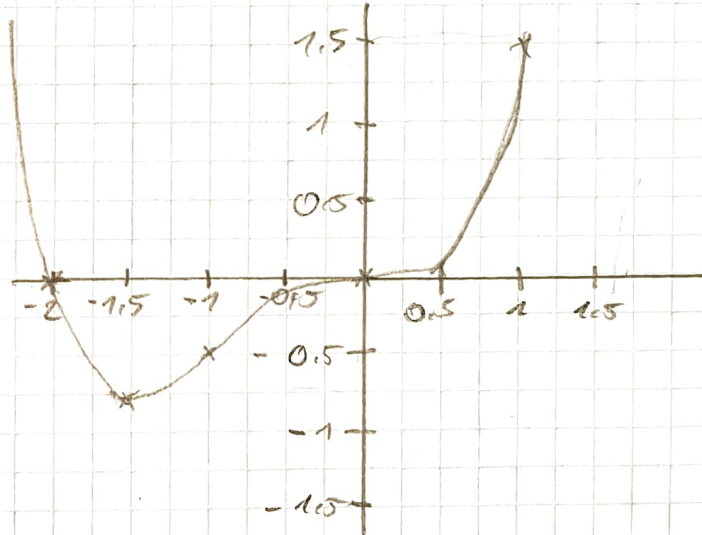
$x = -2$

$x^3 = 0 \quad | \sqrt[3]{}$

$x = 0$

$x_1 = 0 \quad x_2 = -2$

$$\int_0^{-2} \left(\frac{1}{2}x^4 + x^3\right) dx \left[\frac{0,5}{5}x^5 + \frac{1}{4}x^4 \right]_0^{-2}$$
$$= (-3,2 + 4) - (0 + 0)$$
$$\frac{4}{5} - 0 = \underline{\underline{0,8 \text{ FE}}}$$



$$c) f(x) = -x^4 + 6x^3 - 9x^2$$

$$f(x) = x^2(-x^2 + 6x - 9) \quad | \cdot (-1)$$

$$f(x) = -x^2(x^2 - 6x + 9)$$

$$\frac{6}{2} \pm \sqrt{\left(\frac{-6}{2}\right)^2 - 9}$$

$$x_1 = 3$$

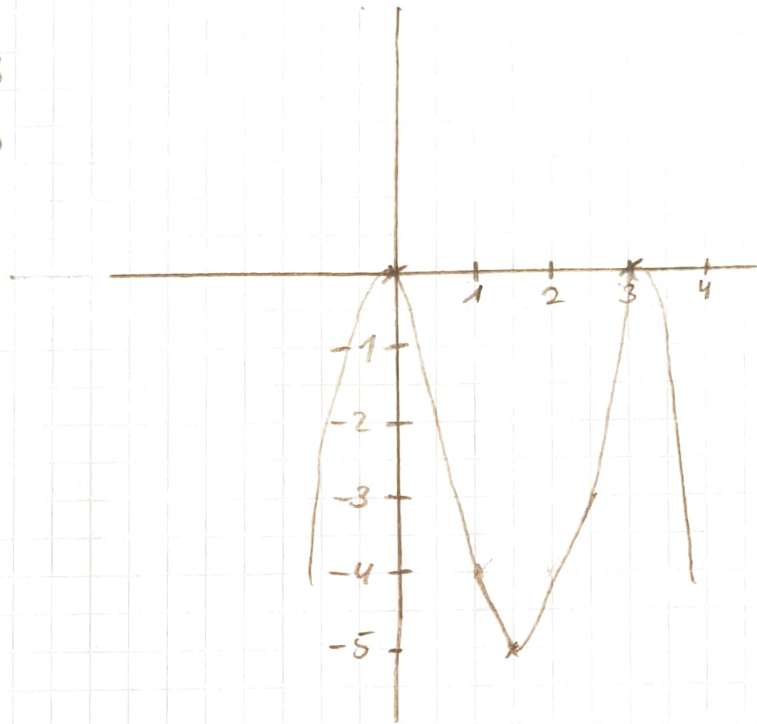
$$x_2 = 3$$

$$x_3 = 0$$

$$x_4 = 0$$

$$\int_0^3 (-x^4 + 6x^3 - 9x^2) dx \left[-\frac{1}{5}x^5 + \frac{6}{4}x^4 - \frac{9}{3}x^3 \right]$$

$$-8,1 - 0 = -8,1 \text{ FE}$$



$$d) f(x) = \frac{1}{2}x^2 - \frac{1}{2}x - 3$$

$$f(x) = \frac{1}{2}(x^2 - x - 6)$$

$$\frac{1}{2} \pm \sqrt{\left(\frac{-1}{2}\right)^2 + 6}$$

$$x_1 = 3$$

$$x_2 = -2$$

$$\int_{-2}^3 \left(\frac{1}{2}x^2 - \frac{1}{2}x - 3 \right) dx \left[\frac{0,5}{3}x^3 - \frac{0,5}{2}x^2 - 3x + C \right]_{-2}^3$$

$$13,17 - (-38,08) = \underline{\underline{24,91 \text{ FE}}}$$

