Integral Aufgabe 9

$$f_{(x)} = \frac{1}{4}x^4 - \frac{5}{2}x^2 - 6$$

$f_{(x)}$ hat nur gerade Exponenten, somit ist $f_{(x)}$ achsensymmetrisch

Nullstellen:

Substitution:

$u = x^2$

$$f_{(u)} = \frac{1}{4}u^2 - \frac{5}{2}u - 6$$

$$\frac{1}{4}(u^2 - 10u - 24) = 0$$

$u^2 - 10u - 24 = 0$

p, q - Formel:

$p = -10,\ q = -24$

$u_{1,2} = 5 \pm \sqrt{25+24}$

$u_{1,2} = 5 \pm 7$

$u_1 = 12 \dashrightarrow x_{1,2} = \pm \sqrt{12}$

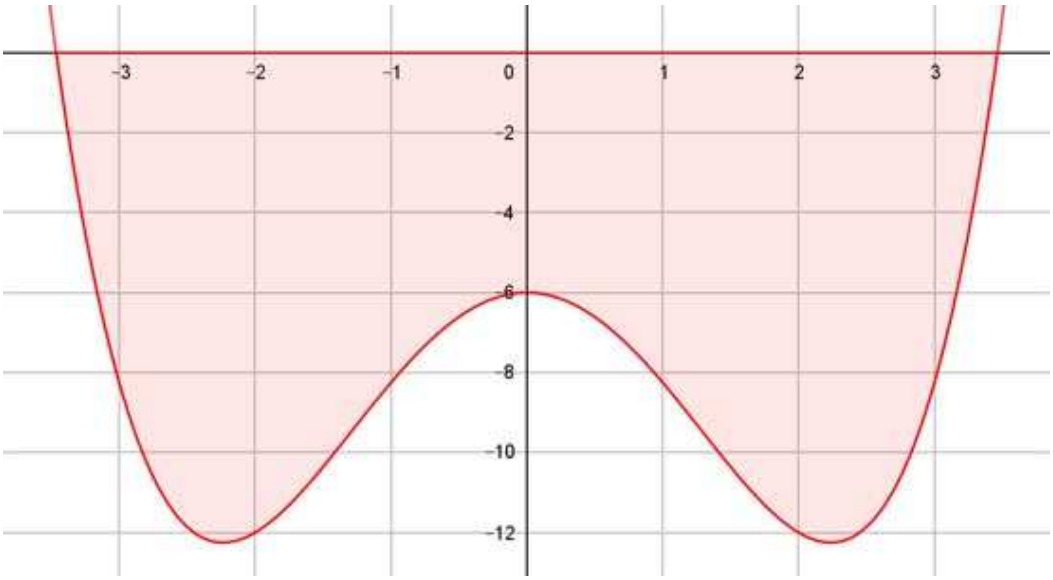
$u_2 = -2 \dashrightarrow x_{3,4} = \pm \sqrt{-2}$ keine Lösung

Wegen Achsensymmetrie:

$$A = 2 * \int_0^{\sqrt{12}} f_{(x)}dx = \int_0^{\sqrt{12}} (-\tfrac{1}{4}x^4 - \tfrac{5}{2}x^2 - 6)dx$$

$$A = 2 * \left|\frac{x^5}{20} - \frac{5x^3}{6} - 6x\right|_0^{\sqrt{12}} = 2 * |24{,}9 - 34{,}6 - 20{,}8|$$

A = 61


-3
-2
-1
0
1
2
3
-2
-4
-6
-8
-10
-12