Aufgabe 1

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

~~$F(x) = \frac{3}{12}x^3 + x = \frac{1}{4}x^3 + x$~~

a) $\int_1^3 \frac{3}{4}x^2 + 1 \, dx = \left[\frac{3}{12}x^3 + x\right]_1^3 = \left[\frac{1}{4}x^3 + x\right]_1^3$

$A_0 = \left(\frac{1}{4} \cdot 3^3 + 3\right) - \left(\frac{1}{4} \cdot 1^3 + 1\right)$

$= 8{,}5$

b) $\int_{-2}^{1} -x^2 - 2x + 4 \, dx = \left[-\frac{1}{3}x^3 - x^2 + 4x\right]_{-2}^{1}$

$A_0 = \left(-\frac{1}{3} \cdot 1^3 - 1^2 + 4 \cdot 1\right) - \left(-\frac{1}{3} \cdot (-2)^3 - (-2)^2 + 4 \cdot (-2)\right)$

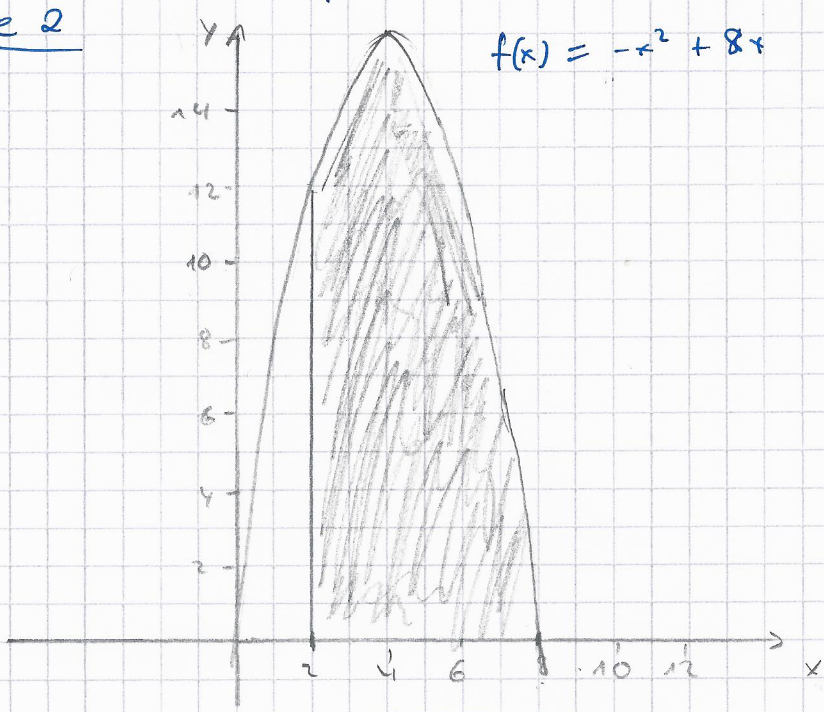
$= 12$

c) $\int_{-2}^{2} -x^4 + 3x^2 + 4 \, dx = \left[-\frac{1}{5}x^5 + x^3 + 4x\right]_{-2}^{2}$

$A_0 = \left(-\frac{1}{5} \cdot 2^5 + 2^3 + 4 \cdot 2\right) - \left(-\frac{1}{5} \cdot (-2)^5 + (-2)^3 + 4 \cdot (-2)\right)$

$= 19{,}2$

Aufgabe 2



$f(x) = -x^2 + 8x$

$\int_2^8 -x^2 + 8x \, dx = \left[-\frac{1}{3}x^3 + 4x^2\right]_2^8$

$A_0 = \left(-\frac{1}{3} \cdot 8^3 + 4 \cdot 8^2\right) - \left(-\frac{1}{3} \cdot 2^3 + 4 \cdot 2^2\right)$

$= \left(-\frac{1}{3} \cdot 512 + 4 \cdot 64\right) - \left(-\frac{1}{3} \cdot 8 + 4 \cdot 4\right)$

$= \left(-\frac{512}{3} + 256\right) - \left(-\frac{8}{3} + 16\right)$

$= -\frac{512}{3} + 256 - \frac{8}{3} - 16$

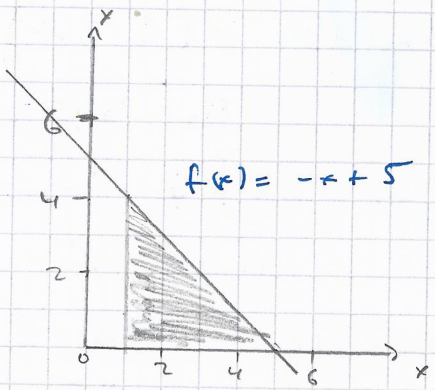
$= -\frac{512}{3} - \frac{8}{3} + 256 - 16$

$= -\frac{520}{3} + 240 = -173{,}3 + 240 = 66{,}7$

Aufgabe 3

a) $\cancel{A = \frac{3\cdot 3}{2} = 4{,}5}$

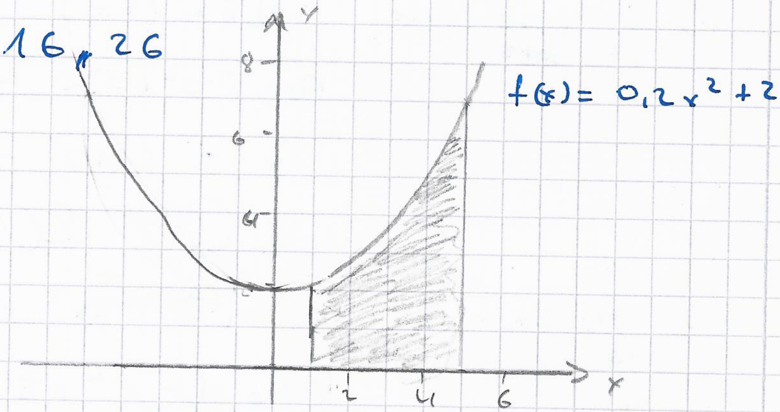
$A = \frac{4\cdot 4}{2} = 8$



b) $\int_1^5 0{,}2x^2+2 \, dx = \left[\frac{0{,}2}{3}x^3+2x\right]_1^5$

$A_0 = \left(\frac{0{,}2}{3}\cdot 5^3+2\cdot 5\right) - \left(\frac{0{,}2}{3}\cdot 1^3+2\cdot 1\right)$

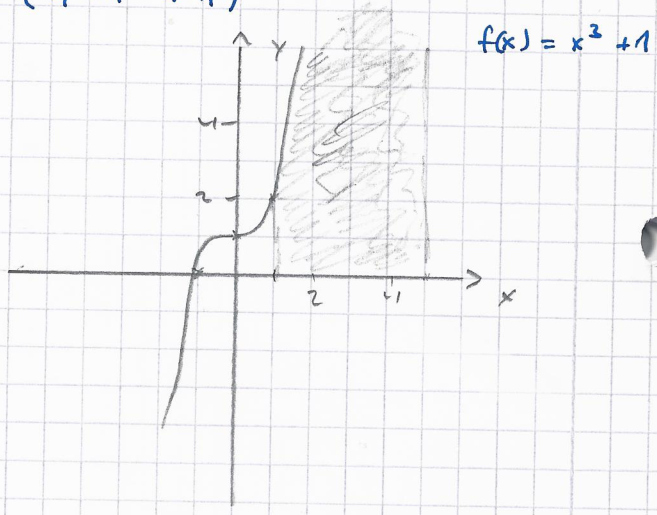
$= 16{,}26$



c) $\int_1^5 x^3+1 \, dx = \left[\frac{1}{4}x^4+x\right]_1^5$

$A_0 = \left(\frac{1}{4}\cdot 5^4+5\right) - \left(\frac{1}{4}\cdot 1^4+1\right)$

$= 160$



d) $\int_1^5 -\frac{3}{4}x^2+27 \quad dx = \left[-\frac{3}{12}x^3+27x\right]_1^5 = \left[\frac{1}{4}x^3 \quad +27x\right]_1^5$

$A_O = \left(\frac{1}{4}\cdot 5^3+27\cdot 5\right)-\left(\frac{1}{4}\cdot 1^3+27\cdot 1\right)$

$= 139$