Fabian Hemann

Mathe

HA

S213

Nr. 1)

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

$A = \int_1^3 (\frac{3}{4}x^2 + 1)\,dx = [\frac{1}{4}x^3 + \frac{1}{2}x^2 + c]_1^3$

$= \frac{1}{4} \cdot 3^3 + \frac{1}{2} \cdot 3^2 + c - \frac{1}{4} \cdot 1^3 + \frac{1}{2} \cdot 1^2 + c$

$= 11{,}25 + c - 0{,}75 + c$

$= 11{,}25 - 0{,}75$

$= 10{,}75$

b) $g(x) = -x^2 - 2x + 4$

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

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

$= \frac{8}{3} - (-\frac{28}{3})$

$= 12$

c) $h(x) = -x^4 + 3x^2 + 4$

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

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

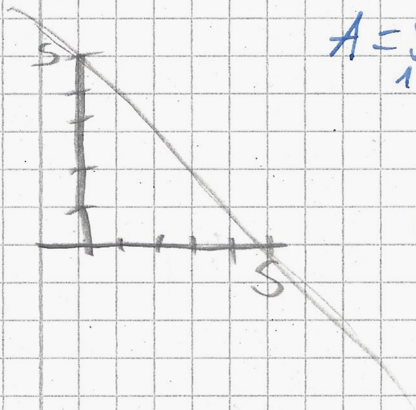
$= \frac{48}{5} + \frac{48}{5}$

$= 19{,}2$

Fabian Homann

3a)

$f(x)=-x+5$

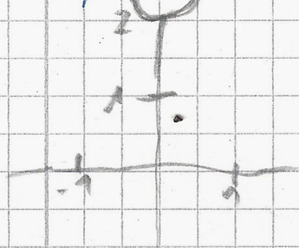


$A=\int_1^5(-x+5)\,dx=\left[\frac{1}{2}x^2+5x\right]$

$=\frac{1}{2}\cdot5^2+5\cdot5-\frac{1}{2}\cdot1^2+5\cdot1=27{,}5-5{,}5$

$=\underline{\underline{22}}$

b) $f(x)=0{,}2x^2+2$

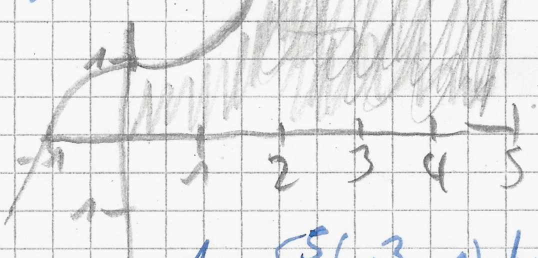


$A=\int_1^5(0{,}2x^2+2)\,dx=\left[\frac{1}{15}x^3+2x\right]_1^5$

$=\frac{1}{15}\cdot5^3+2\cdot5-\frac{1}{15}\cdot1^3+2\cdot1$

$=20{,}26$

c) $f(x)=x^3+1$



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

$=\frac{1}{3}\cdot5^4+1\cdot5-\frac{1}{3}\cdot1^4+1\cdot1=\underline{\underline{214}}$

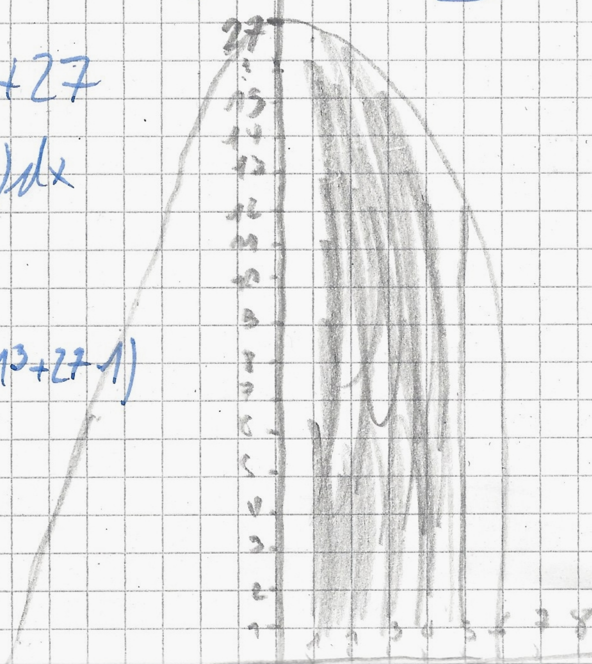
d) $f(x)=-\frac{3}{4}x^2+27$

$A=\int_1^5\left(-\frac{3}{4}x^2+27\right)dx$

$=\left[-\frac{1}{4}x^3+27x\right]_1^5$

$-\frac{1}{4}\cdot5^3+27\cdot5-\left(\frac{1}{4}\cdot1^3+27\cdot1\right)$

$=\underline{\underline{77}}$



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

$I = [2;8]$

$f(x) = -x^2 + 8x = 0$

$x(-x+8) = 0$

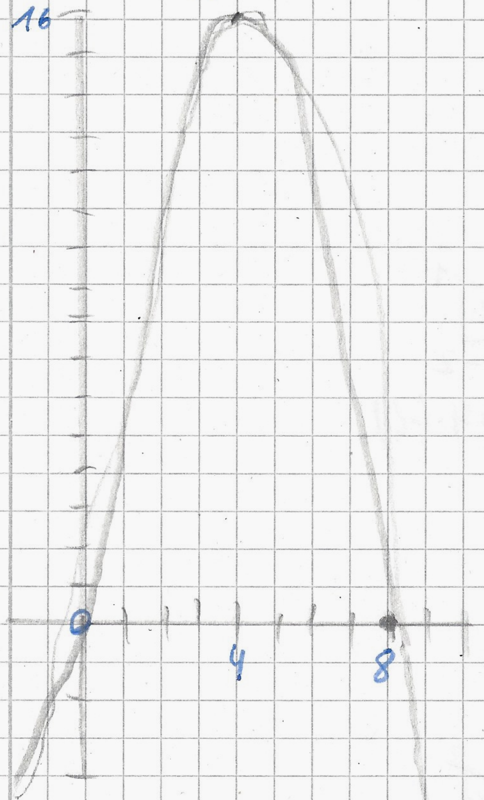
$-x+8 = 0 \quad |-8$

$-x = -8 \quad |:(-1)$

$x_2 = 8$

$x_1 = 0$

$HOP = 4|16$



$A = \int_2^8 (-x^2+8x)\,dx = [-\frac{1}{3}x^3 + 4x^2]$

$-\frac{1}{3} \cdot 8^3 + 4 \cdot 8^2 - (-\frac{1}{3} \cdot 2^3 + 4 \cdot 2^2) = \frac{256}{3} - \frac{40}{3} = \underline{\underline{72}}$