S. 24

7 a) $\left[\frac{1}{8}x^2\right]_{-4}^{2} = \frac{1}{2} - 2 = -\frac{3}{2}$; es muss eine Nullstelle im Integrationsbereich geben.

b) $\left[-u^2+2u\right]_{-1}^{2} = 0+1+2 = 3$; Nullstelle liegt im Integrationsbereich.

c) $\left[\frac{3}{4}t^2+0{,}5t\right]_{1}^{-2} = 2 - \frac{5}{4} = \frac{3}{4}$; „untere" Fläche größer als „obere"

d) $\left[-\frac{x^3}{3}+2x\right]_{-2}^{2{,}5} = -0{,}21+1{,}33 = 1{,}12$; „obere" Fläche größer als „untere"

8 a) $\int_{-2}^{x} 3t^2\,dt = [t^3]_{-2}^{x} = x^3+8 \Rightarrow x_0 = -2$; ~~Extremum in~~ Terassenpunkt! $x_E = 0$ f!

b) $\int_{2}^{x} t^3\,dt = \left[\frac{t^4}{4}\right]_{2}^{x} = \frac{x^4}{4} - 4 \Rightarrow x_{1/2} = \pm 2$; Extremum in $x_E = 0$

c) $\int_{-0{,}5}^{x} (-8t+1)\,dt = [-4t^2+t]_{-0{,}5}^{x} = -4x^2+x+1+0{,}5 = -4x^2+x+1{,}5 \Rightarrow x_1 = -\frac{1}{2};\ x_2 = -\frac{3}{4};\ x_E = \frac{1}{8}$

d) $\int_{2}^{x} (3t^2-2t)\,dt = [t^3-t^2]_{2}^{x} = x^3-x^2-4$

$x_1 = 2$; $(x^3-x^2-4) : (x-2) = x^2+x+2$

$-(x^3-2x^2)$

x^2-4 $\Rightarrow$ keine weiteren Nullstellen $D = b^2-4ac = 1-8 < 0$

$-(x^2-2x)$

$2x-4$

$x_E = 0; \frac{2}{3}$

e) $\int_{-1}^{x} 3(t+1)(t-1)\,dt = \int_{-1}^{x} (3t^2-3)\,dt = [t^3-3t]_{-1}^{x} = x^3-3x-2$

$x_1 = -1$; $(x^3-3x-2) : (x+1) = x^2-x-2 = (x+1)(x-2)$

$-(x^3+x^2)$

$-x^2-3x$ $\quad x_1 = -1;\ x_2 = 2$

$-(-x^2-x)$

$-2x-2$

$x_E = \pm 1$

9 a) $\int_{0}^{\ln 2} f(x)\,dx = F(\ln 2) - F(0) = 2 - 1{,}5 = 0{,}5$

Fläche = 0,5

b) $\int_{0{,}75}^{-1} f(x)\,dx = 1{,}6 - 0{,}2 = 1{,}4$

Fläche = 1,4

f

c) $\int_{-1{,}5}^{0{,}5} f(x)\,dx = \cancel{1{,}6-0{,}7+0{,}8-0{,}7=1}$ $1{,}7-0{,}8 = 0{,}9$

Fläche = $\cancel{1}$ 1,1

$A = \left|\int_{-1{,}5}^{-1} f(x)\,dx\right| + \int_{-1}^{0{,}5} f(x)\,dx = |0{,}7-0{,}8| + 1{,}7 - 0{,}7 = 1{,}1$

d) $\int_{-1{,}5}^{0{,}5} f(x)\,dx = 0{,}3 - 1 = -0{,}7$

Fläche = 0,6+0,1+0,2 = 0,9

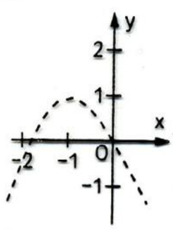
10 a) $-\frac{4}{x^2} = f(x) \Rightarrow f(8) - f(4) = \frac{3}{16}$

b) $f(-0{,}5) = -16 + c = -20 \Rightarrow c = -4 \Rightarrow f(10) = -\frac{4}{100} - 4 = -4{,}04$

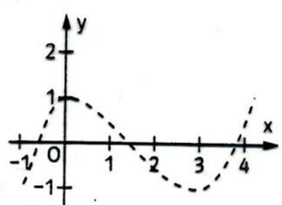
11 $s(t) = \frac{1}{2} \cdot 9{,}81 \cdot t^2 \Rightarrow s(t) = 44{,}14\,\text{m}$

S. 28

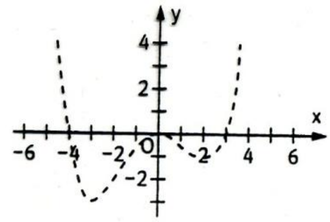
8 a)



b)



c)



d)