Schilde als Flächen

http://swordsandarmor.com/mall/shield-SH800-Richard-Lionheart.htm

Abb. 1-1: Richard Löwenherz' Schield

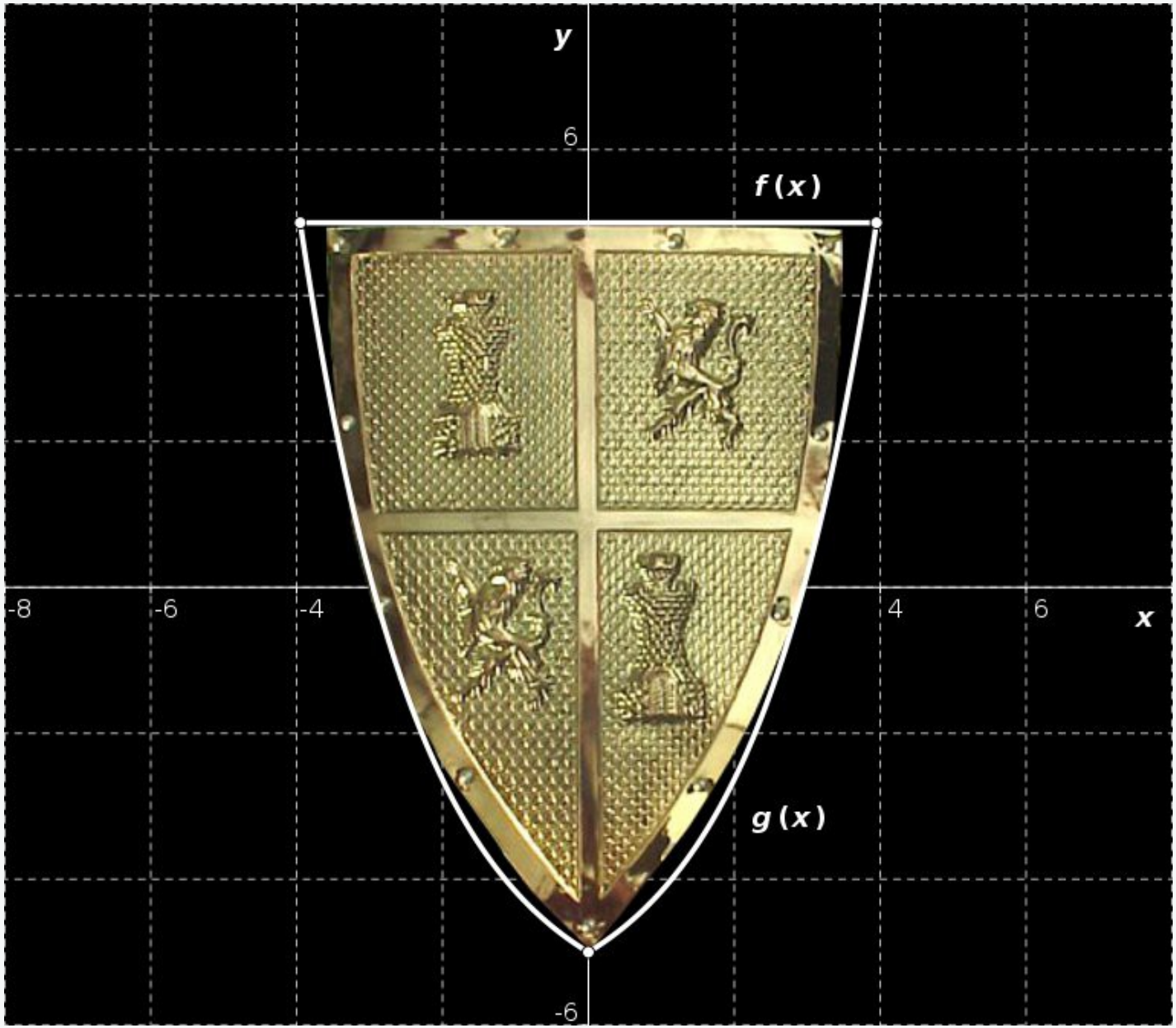


Abb. 1-2: Ein Detail des Schieldes von Richard Löwenherz

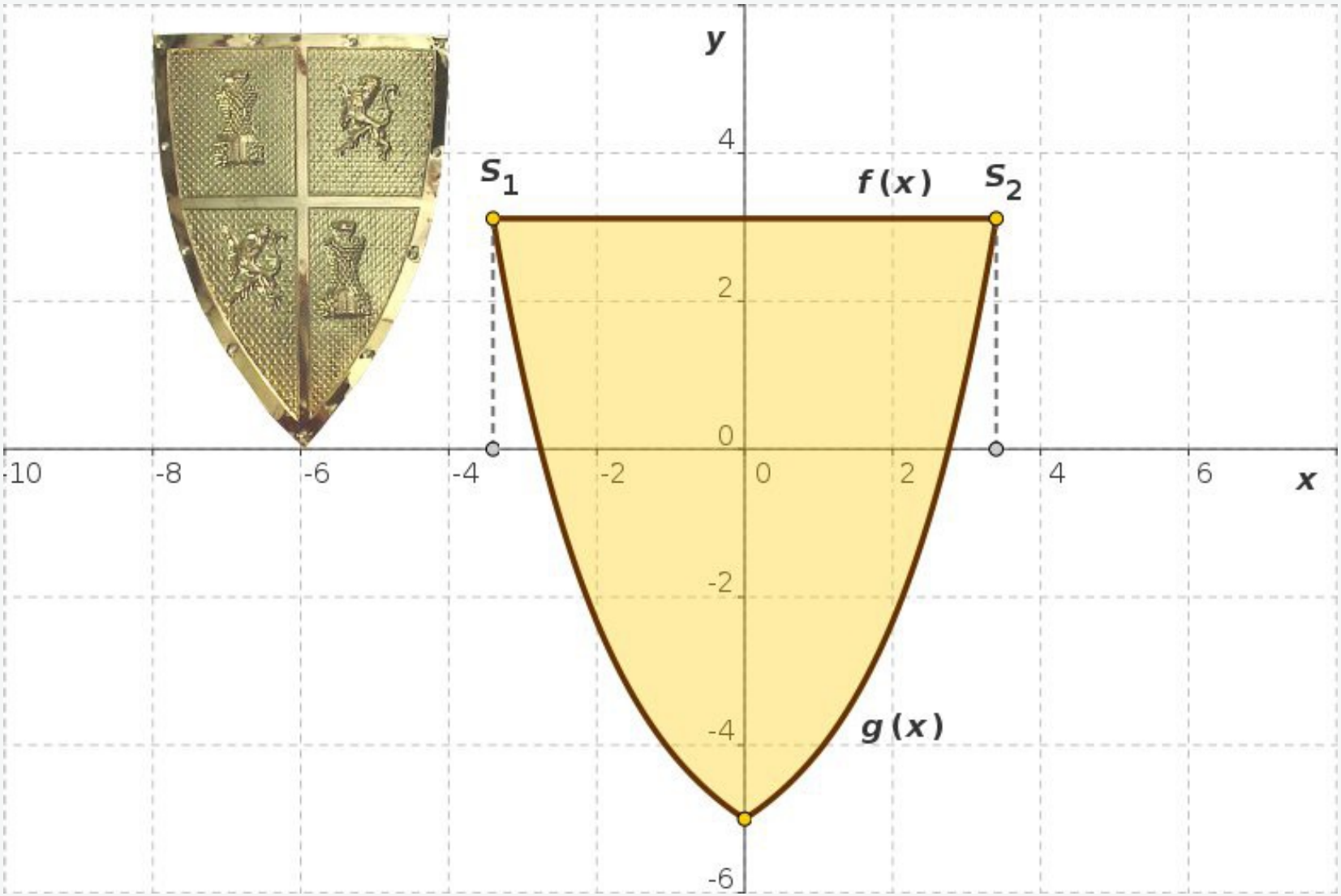


Abb. 2-1: Fläche, die zwischen den Funktionen $y = f(x)$ und $y = g(x)$ eingeschlossen ist

$$f(x) = 3.12, \qquad g(x) = e^{0.65|x|} - 6$$

$$f(x) = a\,, \qquad g(x) = e^{b|x|} - 6, \qquad a = 3.12, \qquad b = 0.65$$

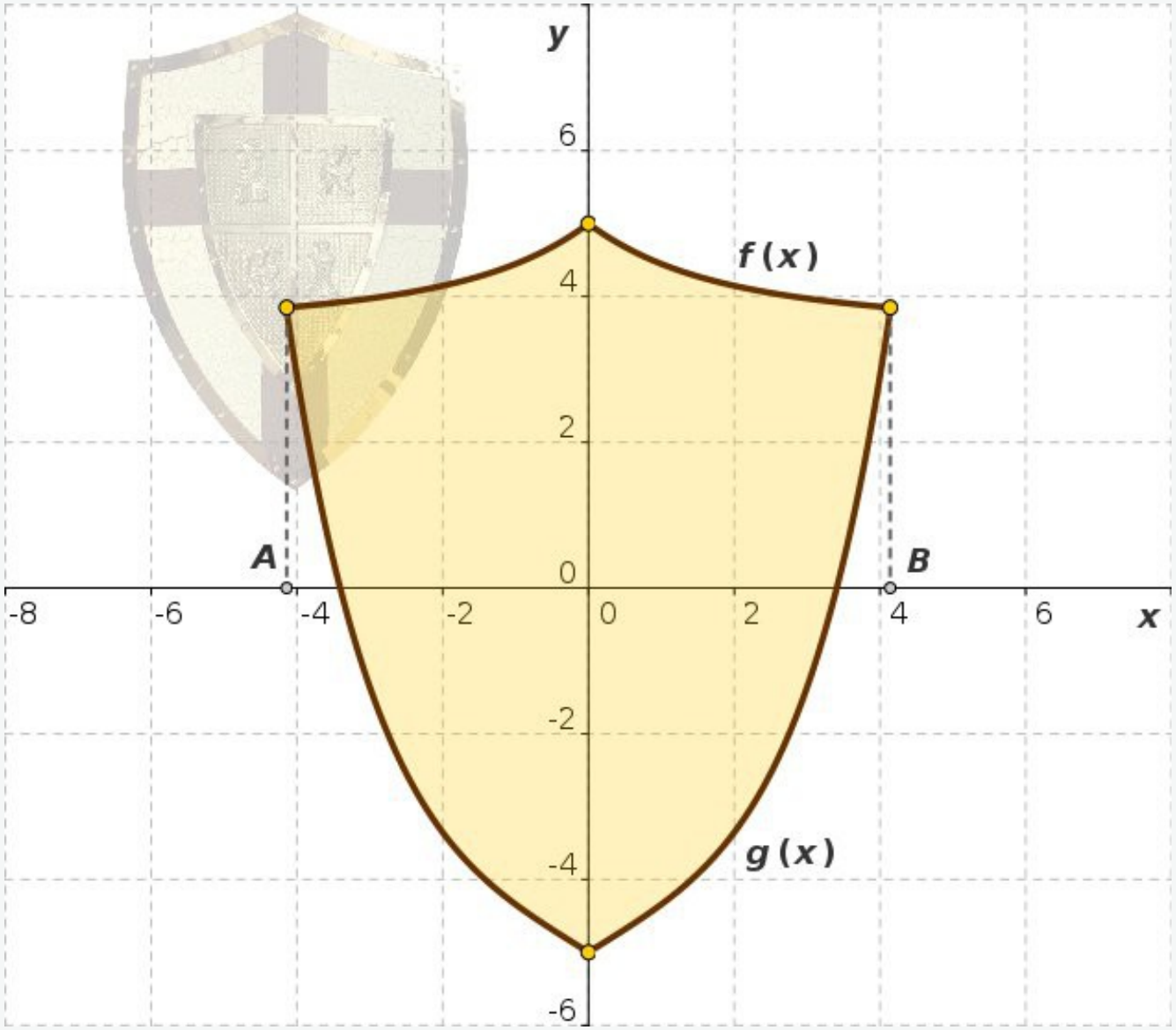
$$S_1 = (-c\,,\ a)\,, \qquad S_2 = (c\,,\ a)\,, \qquad c = \frac{1}{b}\ln(6 + a)$$

$$A = \int_{x=-c}^{c} \int_{y=g(x)}^{f(x)} dy\,dx = 2\int_{x=0}^{c} \int_{y=g(x)}^{f(x)} dy\,dx =$$

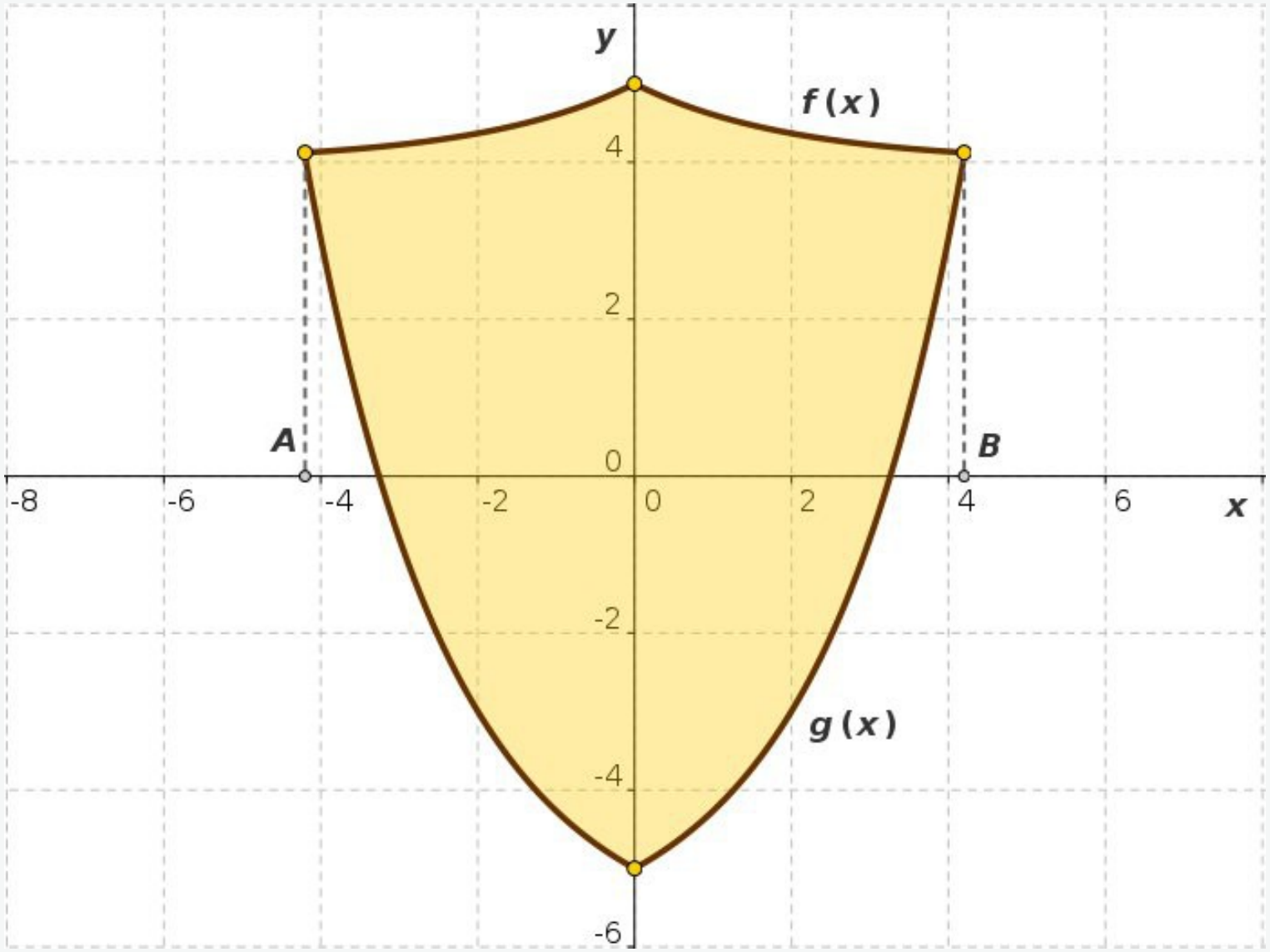
$$= 2\int_{x=0}^{c} \int_{y=e^{bx}-6}^{a} dy\,dx = 2\int_{x=0}^{c} (a - e^{bx} + 6)\,dx =$$

$$= \frac{2}{b}\left[(6 + a)\ln(6 + a) - 5 - a\right] \text{FE}$$

$$A = 2\int_{x=0}^{\frac{\ln(9.12)}{0.65}} \int_{y=e^{0.65x-6}}^{3.12} dy\,dx = 21.16\ \ (\text{FE})$$



$$f(x) = 4 + e^{-0.7|x|} - 0.05\,|x|, \qquad g(x) = e^{0.63|x|} - 6 - 0.22\,x^2$$



$$f(x) = 4 + e^{-\frac{|x|}{2}}, \qquad g(x) = e^{\frac{|x|}{2}} - 6$$

$$f(x) = 4 + e^{-\frac{|x|}{2}}, \qquad g(x) = e^{\frac{|x|}{2}} - 6$$

$$A = (-a,\ b), \qquad B = (a,\ b)$$

$$A = \int_{x=-a}^{a} \int_{y=g(x)}^{f(x)} dy\, dx = 2 \int_{x=0}^{a} \int_{y=g(x)}^{f(x)} dy\, dx =$$

$$= 2 \int_{x=0}^{a} \int_{y=e^{\frac{x}{2}}-6}^{4+e^{-\frac{x}{2}}} dy\, dx = 2 \int_{x=0}^{a} \left(10 + e^{-\frac{x}{2}} - e^{\frac{x}{2}} \right) dx =$$

$$= 4 \left[5x - e^{-\frac{x}{2}} - e^{\frac{x}{2}} \right]_0^a =$$

$$= 4 \left(2 + 5a - e^{-\frac{a}{2}} - e^{\frac{a}{2}} \right) \quad \text{(FE)}$$