

# Übungen zur Berechnung von Integralen: S. 97 (4)

Vorgehensweise:

a)  $\int_0^4 x^2 dx = \left[ \frac{1}{3} x^3 \right]_0^4$  1) Stammfunktion bilden  
 $= \frac{1}{3} \cdot 4^3 - \frac{1}{3} \cdot 0^3$  2) Grenzen einsetzen:  
 $= \frac{64}{3} - 0$  3) berechnen  
 $= \frac{64}{3}$

b)  $\int_2^4 x^2 dx = \left[ \frac{1}{3} x^3 \right]_2^4 = \frac{64}{3} - \frac{8}{3} = \frac{56}{3} = 18\frac{2}{3}$

c)  $\int_{-1}^5 2x dx = \left[ x^2 \right]_{-1}^5 = 25 - (-1)^2 = 24$

d)  $\int_{10}^{11} 0,5x dx = \left[ \frac{1}{2} \cdot \frac{1}{2} x^2 \right]_{10}^{11} = \frac{121}{4} - \frac{100}{4} = \frac{21}{4} = 5,25$

e)  $\int_{10}^{20} 5 dx = \left[ 5x \right]_{10}^{20} = 100 - 50 = 50$

f)  $\int_0^1 x^3 dx = \left[ \frac{1}{4} x^4 \right]_0^1 = \frac{1}{4}$

g)  $\int_0^3 \frac{1}{2} x^2 dx = \left[ \frac{1}{6} x^3 \right]_0^3 = \frac{27}{6} = \frac{9}{2} = 4,5$

h)  $\int_{-2}^0 \frac{1}{3} x^3 dx = \left[ \frac{1}{12} x^4 \right]_{-2}^0 = 0 - \left( \frac{1}{12} \cdot (-2)^4 \right) = -\frac{16}{12} = -\frac{4}{3}$

i)  $\int_{-2}^{-1} \frac{1}{8} x^4 dx = \left[ \frac{1}{40} x^5 \right]_{-2}^{-1} = \frac{1}{40} \cdot (-1) - \frac{1}{40} \cdot (-32) = \frac{31}{40}$

l)  $\int_{90}^{100} 1 dx = \left[ x \right]_{90}^{100} = 10$