

Lösungen zur Berechnung einfacher Integrale

Aufgabe	Rechenweg	Lösung
a. $\int_2^5 x^2 dx$	$\left[\frac{1}{3}x^3\right]_2^5 = \frac{1}{3}5^3 - \frac{1}{3}2^3 = 39$	39
b. $\int_2^4 x^3 dx$	$\left[\frac{1}{4}x^4\right]_2^4 = \frac{1}{4}4^3 - \frac{1}{4}2^3 = 60$	60
c. $\int_2^4 6 dx$	$[6x]_2^4 = 6 \cdot 4 - 6 \cdot 2 = 12$	12
d. $\int_2^5 x^4 dx$	$\left[\frac{1}{5}x^5\right]_2^5 = \frac{1}{5}5^5 - \frac{1}{5}2^5 = 618,6$	618,6
e. $\int_{-1}^2 x^7 dx$	$\left[\frac{1}{8}x^8\right]_{-1}^2 = \frac{1}{8}2^8 - \frac{1}{8}(-1)^8 = 31\frac{7}{8}$	$31\frac{7}{8}$
f. $\int_1^6 x^5 dx$	$\left[\frac{1}{6}x^6\right]_1^6 = \frac{1}{6}6^6 - \frac{1}{6}1^6 = 7775,8\bar{3}$	$7775,8\bar{3}$
g. $\int_{-2}^6 x dx$	$\left[\frac{1}{2}x^2\right]_{-2}^6 = \frac{1}{2}6^2 - \frac{1}{2}(-2)^2 = 16$	16
h. $\int_1^5 (82x^2 + 3x^3) dx$	$\left[\frac{82}{3}x^3 + \frac{3}{4}x^4\right]_1^5 = \frac{82}{3}5^3 + \frac{3}{4}5^4 - \left(\frac{82}{3}1^3 + \frac{3}{4}1^4\right) = 3857, \bar{3}$	$3857, \bar{3}$
i. $\int_0^4 (3 + 5x^3) dx$	$\left[3x + \frac{5}{4}x^4\right]_0^4 = 3 \cdot 4 + \frac{5}{4}3^4 - (3 \cdot 0 + \frac{5}{4}0^4) = 332$	332
j. $\int_1^5 (2x^5 - 9x^4) dx$	$\left[\frac{1}{3}x^6 - \frac{9}{5}x^5\right]_1^5 = \frac{1}{3}5^6 - \frac{9}{5}5^5 - \left(\frac{1}{3}1^6 - \frac{9}{5}1^5\right) = -415,2$	-415,2
k. $\int_{-5}^{-3} (-4x^7 + 15x^4) dx$	$\left[-\frac{1}{2}x^8 + 3x^5\right]_{-5}^{-3} = -\frac{1}{2}(-3)^8 + 3(-3)^5 - \left[-\frac{1}{2}(-5)^8 + 3(-5)^5\right] = 200678$	200678
l. $\int_{-2}^6 (-x^3 + 2x^2 - 3x + 6) dx$	$\left[-\frac{1}{4}x^4 + \frac{2}{3}x^3 - \frac{3}{2}x^2 + 6x\right]_{-2}^6 = -\frac{1}{4}6^4 + \frac{2}{3}6^3 - \frac{3}{2}6^2 + 6 \cdot 6 - \left[-\frac{1}{4}(-2)^4 + \frac{2}{3}(-2)^3 - \frac{3}{2}(-2)^2 + 6(-2)\right] = -170, \bar{6}$	$-170, \bar{6}$
m. $\int_{-0,5}^{-2} (3x^5 + 2x^2) dx$	$\left[\frac{1}{2}x^6 + \frac{2}{3}x^3\right]_{-0,5}^{-2} = \frac{1}{2}(-2)^6 + \frac{2}{3}(-2)^3 - \left[\frac{1}{2}(-0,5)^6 + \frac{2}{3}(-0,5)^3\right] \approx 26,74$	26,74
n. $\int_{-3}^3 (3x^3 + 3x) dx$	$\left[\frac{3}{4}x^4 + \frac{3}{2}x^2\right]_{-3}^3 = \frac{3}{4}3^4 + \frac{3}{2}3^2 - \left[\frac{3}{4}(-3)^4 + \frac{3}{2}(-3)^2\right] = 74,25 - 74,25 = 0$	0