# *Lösungen:* Ableitungsregeln

(1) $f_1(x) = \frac{2}{3} \cdot \ln x$ $\quad f_1'(x) = \frac{2}{3} \cdot \frac{1}{x} = \frac{2}{3x}$

(2) $f_2(x) = -5 \cdot e^x$ $\quad f_2'(x) = -5 \cdot e^x$

(3) $f_3(x) = \frac{7}{x} = 7x^{-1}$ $\quad f_3'(x) = 7 \cdot (-1) \cdot x^{-2} = -\frac{7}{x^2}$

(4) $f_4(x) = 4 \cdot \sqrt{x^3} = 4x^{\frac{3}{2}}$ $\quad f_4'(x) = 4 \cdot \frac{3}{2} \cdot x^{\frac{1}{2}} = 6 \cdot \sqrt{x}$

(5) $f_5(x) = \frac{1}{2} \cdot \sin x$ $\quad f_5'(x) = \frac{1}{2} \cdot \cos x$

(6) $g_1(x) = \frac{1}{3}x^3 + \frac{1}{2}x^2$ $\quad g_1'(x) = \frac{1}{3} \cdot 3x^2 + \frac{1}{2} \cdot 2x = x^2 + x$

(7) $g_2(x) = \frac{e^x}{4} + 5 = \frac{1}{4}e^x + 5$ $\quad g_2'(x) = \frac{1}{4}e^x$

(8) $g_3(x) = \frac{5}{x} + \frac{10}{x^2} = 5x^{-1} + 10x^{-2}$ $\quad g_3'(x) = -5x^{-2} - 20x^{-3} = -\frac{5}{x^2} - \frac{20}{x^3}$

(9) $g_4(x) = -7 \sin x - 8 \cos x$ $\quad g_4'(x) = -7 \cos x + 8 \sin x$

(10) $g_5(x) = 3 \cdot \sqrt[3]{x} - 12 = 3x^{\frac{1}{3}} - 12$ $\quad g_5'(x) = 3 \cdot \frac{1}{3}x^{-\frac{2}{3}} = \frac{1}{\sqrt[3]{x^2}}$

(11) $h_1(a) = b \cdot \cos a$ $\quad h_1'(a) = -b \cdot \sin a$

(12) $h_2(x) = ax^4 + bx^3$ $\quad h_2'(x) = 4ax^3 + 3bx^2$

(13) $h_3(x) = mx + n$ $\quad h_3'(x) = m$

(14) $h_4(x) = \frac{\sin x}{a} + \frac{x}{\sin a}$ $\quad h_4'(x) = \frac{1}{a} \cos x + \frac{1}{\sin a}$

(15) $h_5(x) = x \cdot y \cdot z$ $\quad h_5'(x) = y \cdot z$