

# Differenzialrechnung

## Aufgabenblatt Ableitungen

### zur Konstanten-, Faktor- und Potenzregel

### Lösungen

Level 1 – Grundlagen – Blatt 2

#### Lösung A1

|                                |                                  |                                  |                                    |
|--------------------------------|----------------------------------|----------------------------------|------------------------------------|
| $f_1(x) = 5 \cdot g_1(x)$      | $f'_1(x) = 5 \cdot g'_1(x)$      | $f_2(x) = 0,255 \cdot g_2(x)$    | $f'_2(x) = 0,25 \cdot g'_2(x)$     |
| $f_3(x) = 10^5 \cdot g_3(x)$   | $f'_3(x) = 10^5 \cdot g'_3(x)$   | $f_4(x) = a \cdot g_4(x)$        | $f'_4(x) = a \cdot g'_4(x)$        |
| $f_5(x) = b^{-1} \cdot g_5(x)$ | $f'_5(x) = b^{-1} \cdot g'_5(x)$ | $f_6(t) = \sqrt{2} \cdot g_6(t)$ | $f'_6(t) = \sqrt{2} \cdot g'_6(t)$ |
| $f_7(t) = 125x \cdot g_7(t)$   | $f'_7(t) = 125x \cdot g'_7(t)$   |                                  |                                    |

#### Lösung A2

|   |                           |                             |
|---|---------------------------|-----------------------------|
| $f_1(x) = \frac{1}{2}x + \frac{1}{3}x + \frac{1}{4}x$ | $f_1(x) = \frac{13}{12}x$ | $f'_1(x) = \frac{13}{12}$   |
| $f_2(x) = 5(x^2 + 5) - 2x^2$                          | $f_2(x) = 3x^2 + 25$      | $f'_2(x) = 6x$              |
| $f_3(x) = 21(t - x)(t + x)$                           | $f_3(x) = 21t^2 - 21x^2$  | $f'_3(x) = -42x$            |
| $f_4(x) = \frac{1}{3}x^3 + \frac{5}{3}x^3$            | $f_4(x) = 2x^3$           | $f'_4(x) = 6x^2$            |
| $f_5(x) = (3 - 6)x^5 + 2x^5$                          | $f_5(x) = -x^5$           | $f'_5(x) = -5x^4$           |
| $f_6(t) = 3 \cdot 5 \cdot t^2 \cdot t^3 + t^5$        | $f_6(t) = 16t^5$          | $f'_6(t) = 80t^4$           |
| $f_7(t) = \frac{3t^4 \cdot 2t^2 \cdot 1}{7}$          | $f_7(t) = \frac{6}{7}t^6$ | $f'_7(t) = \frac{36}{7}t^5$ |

#### Lösung A3

|                                  |                              |                              |
|----------------------------------|------------------------------|------------------------------|
| $f_1(x) = x^9$                   | $f'_1(x) = 9x^8$             | $f''_1(x) = 72x^7$           |
| $f_2(x) = 2x^5$                  | $f'_2(x) = 10x^4$            | $f''_2(x) = 40x^3$           |
| $f_3(x) = \frac{5}{3}x^{15}$     | $f'_3(x) = 25x^{14}$         | $f''_3(x) = 350x^{13}$       |
| $f_4(x) = ax^5$                  | $f'_4(x) = 5ax^4$            | $f''_4(x) = 20ax^3$          |
| $f_5(x) = \frac{1}{b} \cdot x^6$ | $f'_5(x) = \frac{6}{b}x^5$   | $f''_5(x) = \frac{30}{b}x^4$ |
| $f_6(t) = e^2(1 + t^3)$          | $f'_6(t) = 3e^2t^2$          | $f''_6(t) = 6e^2t$           |
| $f_7(t) = \frac{125}{x}t^3$      | $f'_7(t) = \frac{375}{x}t^2$ | $f''_7(t) = \frac{750}{x}t$  |