

Bestimme jeweils den Term der 1. Ableitung.

Produktregel

1.  $f(x) = x \cdot e^x$

$$f'(x) = (x+1) \cdot e^x$$

2.  $f(x) = e^x \cdot e^x$

$$f'(x) = 2e^{2x}$$

3.  $f(x) = (2x+1) \cdot e^x$

$$f'(x) = (2x+3) \cdot e^x$$

4.  $f(x) = \sqrt{x} \cdot e^x$

$$f'(x) = \left(\sqrt{x} + \frac{1}{2\sqrt{x}}\right) \cdot e^x$$

5.  $f(x) = (e^x - 2) \cdot (2 + x^2)$

$$f'(x) = (x^2 + 2x + 2) \cdot e^x - 4x$$

6.  $f(x) = e^x \cdot (1 + e^x)$

$$f'(x) = (1 + 2e^x) \cdot e^x$$

7.  $f(x) = 0,5x^2 \cdot e^x$

$$f'(x) = (0,5x^2 + x) \cdot e^x$$

8.  $f(x) = 4x \cdot e^x$

$$f'(x) = 4(x+1) \cdot e^x$$

9.  $f(x) = \frac{1}{x} \cdot e^x$

$$f'(x) = \left(\frac{1}{x} - \frac{1}{x^2}\right) \cdot e^x$$

10.  $f(x) = \frac{1}{3}x^3 \cdot e^x$

$$f'(x) = \left(\frac{1}{3}x^3 + x^2\right) \cdot e^x$$

11.  $f(x) = e^x \cdot (e^x - 2)$

$$f'(x) = 2e^x \cdot (e^x - 1)$$

12.  $f(x) = (x^2 - 2x + 1) \cdot e^x$

$$f'(x) = (x^2 - 1) \cdot e^x$$

13.  $f(x) = (e^x + 1) \cdot (e^x - 1)$

$$f'(x) = 2e^{2x}$$

14.  $f(x) = x^4 \cdot e^x$

$$f'(x) = (x^4 + 4x^3) \cdot e^x$$

15.  $f(x) = 2e^x \cdot (e^x - 1)$

$$f'(x) = 2e^x \cdot (2e^x - 1)$$

1.  $f(x) = \sqrt{x} (x+1); x \geq 0$

$$f'(x) = \frac{3}{2}\sqrt{x} + \frac{1}{2\sqrt{x}}$$

2.  $f(x) = \sqrt{x} (x^2 + \sqrt{x}); x \geq 0$

$$f'(x) = \frac{5}{2}\sqrt[3]{x^2} + 1$$

3.  $f(x) = (\sin x + 1) x^2$

$$f'(x) = x^2 \cos x + 2x \sin x + 2x$$

4.  $f(x) = (\cos x + x)(x - 1)$

$$f'(x) = (1-x)\sin x + \cos x + 2x + 1$$

5.  $f(x) = (2\sin x + 1) \sin x$

$$f'(x) = (4\sin x + 1) \cos x$$

6.  $f(x) = \sqrt{x} \sin x; x \geq 0$

$$f'(x) = \frac{1}{2\sqrt{x}} \sin x + \sqrt{x} \cos x$$

7.  $f(x) = ax^2 \cos x; a \in \mathbb{R}$

$$f'(x) = ax(2\cos x - x\sin x)$$

8.  $f(x) = \sin x \cos x$

$$f'(x) = \cos^2 x - \sin^2 x$$

$$f'(x) = 2\cos^2 x - 1$$

9.  $f(x) = \sin^2 x = \sin x \sin x$

$$f'(x) = 2 \sin x \cos x$$

10.  $f(x) = \cos^2 x = \cos x \cos x$

$$f'(x) = -2 \sin x \cos x$$