

Lösung Ableitung „Sonderaufgabe“ GK:

a) $f(x) = 3x^2 \cdot e^{4x+1}$

$$u(x) = 3x^2$$

$$u'(x) = 6x$$

$$v(x) = e^{4x+1}$$

$$v'(x) = 4 \cdot e^{4x+1}$$

$$f'(x) = 6x \cdot e^{4x+1} + 3x^2 \cdot 4 \cdot e^{4x+1}$$

$$= e^{4x+1} (6x + 12x^2)$$

$$= e^{4x+1} (12x^2 + 6x)$$

b) $g(x) = x^2 \cdot \sqrt{2x+1}$

$$u(x) = x^2$$

$$u'(x) = 2x$$

$$v(x) = \sqrt{2x+1} = (2x+1)^{\frac{1}{2}}$$

$$v'(x) = \frac{1}{2} \cdot (2x+1)^{-\frac{1}{2}} \cdot 2 \quad \leftarrow \text{s. KR}$$

$$= (2x+1)^{-\frac{1}{2}}$$

$$= \frac{1}{(2x+1)^{\frac{1}{2}}} = \frac{1}{\sqrt{2x+1}}$$

$$g'(x) = 2x \cdot \sqrt{2x+1} + x^2 \cdot \frac{1}{\sqrt{2x+1}}$$
$$= 2x \cdot \sqrt{2x+1} + \frac{x^2}{\sqrt{2x+1}}$$

c) $h(x) = 2x \cdot \sin(4x+1)$

$$u(x) = 2x$$

$$u'(x) = 2$$

$$v(x) = \sin(4x+1)$$

$$v'(x) = \cos(4x+1) \cdot 4 = 4 \cos(4x+1)$$

$$h'(x) = 2 \cdot \sin(4x+1) + 2x \cdot 4 \cos(4x+1)$$

$$= 2 \sin(4x+1) + 8x \cdot \cos(4x+1)$$