

Nr. 11) a)  $f(x) = x^2 \cdot g(x)$

$$\underline{f'(x) = 2x \cdot g(x) + x^2 \cdot g'(x)}$$

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

$$\underline{\underline{f''(x) = 2 \cdot g(x) + 4x \cdot g'(x) + x^2 \cdot g''(x)}}$$

b)  $f(x) = x \cdot g'(x)$

$$\underline{f'(x) = 1 \cdot g'(x) + x \cdot g''(x)}$$

$$f''(x) = g''(x) + 1 \cdot g''(x) + x \cdot g'''(x)$$

$$\underline{\underline{f''(x) = 2g''(x) + x \cdot g'''(x) = 2g''(x) + xg^{(3)}(x)}}$$

c)  $f(x) = x \cdot g^2(x)$

$$\underline{f'(x) = 1 \cdot g^2(x) + x \cdot (2g(x) \cdot g'(x)) = g^2(x) + 2x \cdot g(x) \cdot g'(x)}$$

$$f''(x) = 2 \cdot g(x) \cdot g'(x) + 1 \cdot 2g(x) \cdot g'(x) + 2x [g'(x) \cdot g'(x) + g(x) \cdot g''(x)]$$

$$\underline{\underline{f''(x) = 4g(x) \cdot g'(x) + 2x \cdot (g'(x))^2 + 2x \cdot g(x) \cdot g''(x)}}$$

d)  $f(x) = g(x) \cdot g'(x)$

$$\underline{f'(x) = g'(x) \cdot g'(x) + g(x) \cdot g''(x) = (g'(x))^2 + g(x) \cdot g''(x)}$$

$$f''(x) = 2 \cdot g'(x) \cdot g''(x) + g'(x) \cdot g''(x) + g(x) \cdot g'''(x)$$

$$\underline{\underline{f''(x) = 3 \cdot g'(x) \cdot g''(x) + g(x) \cdot g'''(x)}}$$