

Klasse	Art	Schwierigkeit	Thema	S. 55
11	Lösung	X	Quotientenregel	4

$$\text{a) } f(x) = \frac{x}{x+1} \Rightarrow f'(x) = \frac{1 \cdot (x+1) - x \cdot 1}{(x+1)^2} = \frac{x+1-x}{(x+1)^2} = \frac{1}{(x+1)^2}$$

$$\text{b) } g(x) = \frac{2x}{1+3x} \Rightarrow g'(x) = \frac{2 \cdot (1+3x) - 2x \cdot 3}{(1+3x)^2} = \frac{2+6x-6x}{(1+3x)^2} = \frac{2}{(1+3x)^2}$$

$$\text{c) } f(z) = \frac{1-z^2}{z+2} \Rightarrow f'(z) = \frac{-2z \cdot (z+2) - (1-z^2) \cdot 1}{(z+2)^2} = \frac{-2z^2 - 4z - 16 + z^2}{(z+2)^2} = \frac{-z^2 - 4z - 16}{(z+2)^2}$$

$$\text{d) } f(t) = \frac{t^2 + t + 1}{t^2 - 1} \Rightarrow$$

$$f'(t) = \frac{(2t+1)(t^2-1) - (t^2+t+1) \cdot 2t}{(t^2-1)^2} = \frac{2t^3 - 2t + t^2 - 1 - 2t^3 - 2t^2 - 2t}{(t^2-1)^2} = \frac{-t^2 - 4t - 1}{(t^2-1)^2}$$

$$\text{e) } g(x) = \frac{6x}{15-x^2} \Rightarrow g'(x) = \frac{6 \cdot (15-x^2) - 6x \cdot (-2x)}{(15-x^2)^2} = \frac{90 - 6x^2 + 12x^2}{(15-x^2)^2} = \frac{90 + 6x^2}{(15-x^2)^2}$$

$$\text{f) } h(z) = \frac{4z^2 - 5}{2z+1}$$

$$\Rightarrow h'(z) = \frac{8z \cdot (2z+1) - (4z^2 - 5) \cdot 2}{(2z+1)^2} = \frac{16z^2 + 8z - 8z^2 + 10}{(2z+1)^2} = \frac{8z^2 + 8z + 10}{(2z+1)^2}$$