

Klasse	Art	Schwierigkeit	Thema	S. 55
11	Lösung	XX	Produktregel	11

$$\text{a) } f(x) = \frac{x}{2} + \frac{3}{2x} = \frac{1}{2}x + \frac{3}{2}x^{-1} \Rightarrow f'(x) = \frac{1}{2} - \frac{3}{2}x^{-2} = \frac{1}{2} - \frac{3}{2x^2}$$

$$f'(x) \stackrel{!}{=} -\frac{1}{2} \Leftrightarrow \frac{1}{2} - \frac{3}{2x^2} = -\frac{1}{2} \Leftrightarrow \frac{3}{2x^2} = 1 \Leftrightarrow x^2 = \frac{3}{2} \Leftrightarrow x_{1,2} = \pm \sqrt{\frac{3}{2}}$$

$$\text{b) } f(x) = \frac{1-x^2}{x} \Rightarrow f'(x) = \frac{-2x \cdot x - [(1-x^2) \cdot 1]}{x^2} = \frac{-x^2-1}{x^2}$$

$$f'(x) \stackrel{!}{=} -5 \Leftrightarrow \frac{-x^2-1}{x^2} = -5 \Leftrightarrow -x^2-1 = -5x^2 \Leftrightarrow x_{1,2} = \pm \frac{1}{2}$$

$$\text{c) } f(x) = \frac{x^2-9}{x+2} \Rightarrow f'(x) = \frac{2x(x+2) - [(x^2-9) \cdot 1]}{(x+2)^2} = \frac{x^2+4x+9}{(x+2)^2}$$

$$\frac{x^2+4x+9}{(x+2)^2} = \frac{6}{5} \Leftrightarrow 5x^2+20x+45 = 6x^2+24x+24 \Leftrightarrow x^2+4x-21=0$$

$$x_{1,2} = \frac{-4 \pm \sqrt{16+84}}{2} \Leftrightarrow x_1 = 3; x_2 = -7$$