

Grenzwerte 1

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17:56

$$\begin{aligned} 1) \lim_{x \rightarrow 2} (3x - 5) &= 3 \cdot 2 - 5 \\ &= 6 - 5 \\ &= 1 \end{aligned}$$

$$\begin{aligned} 2) \lim_{x \rightarrow -1} (x^2 + 3x + 2) &= \lim_{x \rightarrow -1} (x+1)(x+2) \\ &= (-1+1)(-1+2) \\ &= 0 \cdot 1 \\ &= 0 \end{aligned}$$

$$\begin{aligned} 3) \lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} &= \lim_{x \rightarrow 1} \frac{(x-1)(x+1)}{x-1} \\ &= \lim_{x \rightarrow 1} x + 1 \\ &= 1 + 1 \\ &= 2 \end{aligned}$$

$$4) \lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

$$5) \lim_{x \rightarrow 0} \frac{\tan x}{x} \left\{ \begin{array}{l} \Rightarrow \\ \tan x \sim x \end{array} \right.$$

$$\Rightarrow \lim_{x \rightarrow 0} \frac{\tan x}{x} = 1$$

$$\begin{aligned} 6) \lim_{x \rightarrow \infty} \frac{2x^2 + 3x}{x^2 - 5} &= \lim_{x \rightarrow \infty} \frac{x^2(2 + \frac{3}{x})}{x^2(1 - \frac{5}{x^2})} \\ &= \lim_{x \rightarrow \infty} \frac{2 + \frac{3}{x}}{1 - \frac{5}{x^2}} \\ &= \frac{2}{1} \\ &= 2 \end{aligned}$$

$$\begin{aligned} 7) \lim_{x \rightarrow \infty} \frac{5x - 1}{x} &= \lim_{x \rightarrow \infty} \left(\frac{5x}{x} - \frac{1}{x} \right) \\ &= \lim_{x \rightarrow \infty} \left(5 - \frac{1}{x} \right) \\ &= 5 - 0 \\ &= 5 \end{aligned}$$

$$\begin{aligned} 8) \lim_{x \rightarrow \infty} (\sqrt{x^2 + x} - x) &= \lim_{x \rightarrow \infty} \frac{x}{\sqrt{x^2 + x} + x} \\ &= \lim_{x \rightarrow \infty} \frac{x}{x(\sqrt{1 + \frac{1}{x}} + 1)} \\ &= \frac{1}{2} \end{aligned}$$

$$9) \lim_{x \rightarrow \infty} \frac{\ln x}{x} \left\{ \begin{array}{l} \Rightarrow \lim_{x \rightarrow \infty} \frac{\ln x}{x} = 0 \\ \ln x \ll x \end{array} \right.$$

$$\begin{aligned} 10) \lim_{x \rightarrow -3} \frac{x^2 + 6x + 9}{x + 3} &= \lim_{x \rightarrow -3} \frac{(x+3)^2}{x+3} \\ &= \lim_{x \rightarrow -3} x + 3 \\ &= -3 + 3 \\ &= 0 \end{aligned}$$