



Math Preparation Course / *Mathe-Vorbereitungskurs*
Sheet 5 / *Blatt 5*

Exercise 1. Compute the limits / Berechne die Grenzwerte.

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| (a) $\lim_{x \rightarrow \infty} \frac{1}{1 - \frac{1}{x}}$ | (f) $\lim_{x \rightarrow 1} \frac{x^3 - x^2}{2x^2 - 2}$ |
| (b) $\lim_{x \rightarrow \infty} \frac{x}{x - 2} \cdot \frac{5x^2}{2 + x^2}$ | (g) $\lim_{x \rightarrow 2} \frac{2^x - 4}{x - 2}$ |
| (c) $\lim_{x \rightarrow 4} \frac{x^2 - x - 12}{(x - 4)x}$ | (h) $\lim_{x \rightarrow 0} 2^{-\frac{1}{x^2}}$ |
| (d) $\lim_{x \rightarrow -3} e^{\left(\frac{1}{x^2 + 6x + 9}\right)} \frac{1}{(x^2 - 9)}$ | (i) $\lim_{x \rightarrow 0} x^2 e^{\ln(x^2)}$ |
| (e) $\lim_{x \rightarrow \infty} \frac{2^x}{2^{x+1} + 2}$ | (j) $\lim_{x \rightarrow y} \frac{x^3 - y^3}{x - y}$ |

Exercise 2. Sketch the following functions / Skizziere die folgenden Funktionen.

- (a) $\sin(2x + 2) + 2$
- (b) $3 \cos\left(\frac{1}{2}x - 1\right)$
- (c) $\sqrt{x - 3} + 2$