

Rational Functions • Limits**Exercises**

1. Calculate the following limits!

a)

$$\lim_{x \rightarrow \infty} \frac{3x + 7}{5x^2 + 2x + 1}$$

b)

$$\lim_{x \rightarrow 3^+} \frac{x^2 + x}{x - 1}$$

c)

$$\lim_{x \rightarrow -\infty} \frac{2x + 4}{3x + 5}$$

d)

$$\lim_{x \rightarrow 2^-} \frac{3x - 6}{x - 2}$$

e)

$$\lim_{x \rightarrow \infty} \frac{x^2}{x + 1}$$

f)

$$\lim_{x \rightarrow 1^+} \frac{x^2 - 2x + 1}{(x - 1)(x + 4)}$$

2. Explain briefly how the end behavior*(i.e. the behavior for $x \rightarrow \pm\infty$)*

of a rational function f , with numerator degree z and denominator degree n , depends on these degrees.

3. Determine the end behavior of the following functions.

a)

$$f(x) = \frac{2x + 2}{x + 1}$$

b)

$$f(x) = \frac{1}{x^2 + 4}$$

c)

$$f(x) = \frac{x^2 + 7}{2x - 6}$$

♡ now it becomes more difficult

4. Determine the maximum domain $D_{\max}$ of f and its behavior at the boundaries of $D_{\max}$.

Then sketch the graph of f in the interval

$$x \in [-5; 4].$$

$$f(x) = \frac{x^2 + x - 2}{x^2 + 3x + 2}$$