

Exercise 5

1. Write the first 5 terms of a sequence:

$$\{a_n\} = \left\{ \left(\frac{1}{5} \right)^{2n} \right\}$$

2.

Write the first 5 terms of the following sequence. Does the sequence converge or diverge?

$$a_1 = 2$$

$$a_n = \left(\frac{1}{2} \right)^n \cdot a_{n-1}$$

3. Calculate the following limit:

$$\lim_{x \rightarrow 0,5} \frac{2x + 1}{4x^2 - 2x}$$

4. Calculate for $x \rightarrow \infty$; $x \rightarrow -\infty$ and $x \rightarrow 0$ the limits of following functions:

a)

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

b)

$$f(x) = e^{2x}$$

5. Calculate the following limits:

a)

$$\lim_{x \rightarrow \infty} [5x^3 - 2x^2 + 17x - 27]$$

b)

$$\lim_{x \rightarrow \infty} \left[\frac{6x^2 - 3}{3x^2 + 5} \right]$$

c)

$$\lim_{x \rightarrow \infty} \left[\frac{14x^2 - 4x + 5}{4x^5 - 3x^3 + 7x^2 - 35} \right]$$

d)

$$\lim_{x \rightarrow -\infty} \left[\frac{-5x^3 + 6x^2 - 4}{2x^2 - 7x + 2} \right]$$

e)

$$\lim_{x \rightarrow 0} \frac{\sqrt{1-x} - 1}{x}$$

f)

$$\lim_{x \rightarrow 2^+} \frac{5 - 7x}{-4 + x^2}$$

g)

$$\lim_{x \rightarrow 0} \cot 5x \cdot \sin 2x$$