



Analiza I - Temelji analize  
IZPIT - PRAKTIČNI DEL  
– 22. JANUAR, 2019 –

Čas: 80 minut. Največje možno število točk: 50. Pišite razločno. Vse odgovore je potrebno utemeljiti.

- (1) [14 t] Naj bosta  $f$  in  $g$  realni funkciji realne spremenljivke, ki sta podani s predpisoma

$$f(x) = \begin{cases} -x^2 + 1 & ; \ x \geq 0 \\ e^x & ; \ x < 0 \end{cases}, \quad g(x) = \begin{cases} 1 & ; \ x < 1 \\ -x + 2 & ; \ x \geq 1 \end{cases}$$

Določite kompozitum  $g \circ f$  in  $f \circ g$ .

- (2) [12 t] V množici kompleksnih števil  $\mathbb{C}$  poiščite vse rešitve enačbe

$$z^6 - 7iz^3 + 8 = 0$$

in jih skicirajte.

- (3) [12 t] Utemeljite, ali je realno zaporedje  $(a_n)_{n \in \mathbb{N}}$ , ki je podano z rekurzivno zvezo

$$a_{n+1} = 5\sqrt{a_n - 1} - 3$$

in prvim členom  $a_1 = 5$ , konvergentno.

- (4) Poiščite limiti:

(a) [6 t]  $\lim_{x \rightarrow 1} \frac{2 - \sqrt{x+3}}{\sqrt{2x-1} - 1}$

(b) [6 t]  $\lim_{x \rightarrow 0} \frac{\sin(2x)}{\sin(4x)}$

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function quicksort(array)
  var list less, equal, greater
  if length(array) ≤ 1
    return array
  select a pivot value pivot from array
  for each x in array
    if x < pivot then append to less
    if x = pivot then append to equal
    if x > pivot then append to greater
  return concatenate(quicksort(list), equal, quicksort(greater))

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University of Primorska  
FAMNIT  
Academic Year 2018/2019

Analysis I  
FINAL EXAM - PRACTICAL PART  
– JANUARY 22 2019 –

Time: 80 minutes. Maximum number of points: 50. Please write clearly, and justify all your answers.

(1) [14 p] Let  $f$  and  $g$  be real functions of a real variable given by

$$f(x) = \begin{cases} -x^2 + 1 & ; x \geq 0 \\ e^x & ; x < 0 \end{cases}, \quad g(x) = \begin{cases} 1 & ; x < 1 \\ -x + 2 & ; x \geq 1 \end{cases}$$

Find  $g \circ f$  and  $f \circ g$ .

(2) [12 p] Find all complex solutions of the equation

$$z^6 - 7iz^3 + 8 = 0$$

and sketch them in a complex plane.

(3) [12 p] Let  $(a_n)_{n \in \mathbb{N}}$  be a real sequence such that

$$a_{n+1} = 5\sqrt{a_n - 1} - 3$$

and  $a_1 = 5$ . Is  $(a_n)_{n \in \mathbb{N}}$  convergent? Justify your answer.

(4) Find limits:

(a) [6 p]  $\lim_{x \rightarrow 1} \frac{2 - \sqrt{x+3}}{\sqrt{2x-1} - 1}$

(b) [6 p]  $\lim_{x \rightarrow 0} \frac{\sin(2x)}{\sin(4x)}$