

Midterm - sample

The Midterm comprises 3 questions:

1. limit of a sequence with roots (7 points)
2. limit of a sequence with scale (7 points)
3. mappings (6 points)

Students have 60 minutes and can use any literature (notes, tables, textbooks...), but no technical devices (phone, calculator, watches...).

Example of midterm questions

1. (7 points) Find the limit of a sequence:

$$\lim_{n \rightarrow \infty} \frac{\sqrt{2n-3} - \sqrt{2n+3}}{\sqrt[3]{n+4} - \sqrt[3]{n-2}}.$$

2. (7 points) Find the limit of a sequence:

$$\lim_{n \rightarrow \infty} \frac{n! + 2^n - 3 \cos(n^2) + 3n^4}{2n^4 + \ln n - 2(n!) - e^n}$$

3. (6x1 point) Find the **image** of the following sets:

(a) $[2, 6)$

(b) $\{0\}$

(c) $(-\infty, 0)$

Find the **preimage** of the following sets:

(a) $(3, 7]$

(b) $\{4\}$

(c) $(-\infty, 0]$

