

FULL NAME: _____
(BLOCK CAPITALS)

STUDENT NUMBER: _____ TUTORIAL GROUP: _____

4CCM115A Numbers and Functions: Test 4

CALCULATORS MAY NOT BE USED

ANSWER GRID: put a cross in ONE BOX for the correct answer for each question. If you change your mind and want to correct your answer, obliterate your incorrect answer by shading its box, and put a new cross in the box for the correct answer.

	a	b	c	d	e
1					
2					
3					
4					

MARKS: each correct answer = +5, incorrect = -1, none (or more than one) = 0.

Do any rough working on the back of this sheet, or on a NAMED separate sheet.

1. Which one of the following sequences is increasing?

(a) $s_n = \frac{n^2}{n^2 + 1}$

(b) $s_n = |n - 50|$

(c) $s_n = 1/n!$

(d) $s_n = \frac{(-1)^n}{n}$

(e) None of the above sequences is increasing.

2. Let $s_n = \cos(2\pi n/3)$, $n \in \mathbb{N}$. Which one of the following statements holds true?

(a) s_n has no limit points

(b) s_n has exactly one limit point

(c) s_n has exactly two limit points

(d) s_n has exactly three limit points

(e) None of the above statements is true.

3. Let $s_n = \left(1 + \frac{1}{2n}\right)^{2n+2}$. Which one of the following statements holds true?

(a) $s_n \rightarrow 1$ as $n \rightarrow \infty$

(b) $s_n \rightarrow e$ as $n \rightarrow \infty$

(c) $s_n \rightarrow \infty$ as $n \rightarrow \infty$

(d) $s_n \rightarrow e^2$ as $n \rightarrow \infty$

(e) None of the above statements is true.

4. Which one of the following statements holds true?

(a) If $s_n \rightarrow 0$ as $n \rightarrow \infty$, then the series $\sum_{n=1}^{\infty} s_n$ converges.

(b) If the series $\sum_{n=1}^{\infty} s_n$ converges, then $s_n \rightarrow 0$ as $n \rightarrow \infty$.

(c) If the series $\sum_{n=1}^{\infty} s_n$ converges, then the series $\sum_{n=1}^{\infty} |s_n|$ converges.

(d) If the series $\sum_{n=1}^{\infty} s_n$ converges, then the series $\sum_{n=1}^{\infty} |s_n|$ converges absolutely.

(e) None of the above statements is true.

END OF TEST