FULL NAME:_____
(BLOCK CAPITALS)

STUDENT NUMBER:_____ TUTORIAL GROUP:_____

4CCM115A Numbers and Functions: Mock Test 3

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. The limit $\lim_{n\to\infty} \dfrac{2^{\frac{n}{2}} + n^2 2^n + n 2^{3n+\frac{3}{n}}}{n 8^{n+1} + n^2 8^{\frac{n}{2}+\frac{2}{n}}}$ equals to ...

(a) 0
(b) ∞
(c) 1/8
(d) 2
(e) none of the above

2. Which one of the following statements holds true?

(a) $n2^n = o(2^{n/2})$ as $n \to \infty$
(b) $\frac{1}{n+n^{-1}} = o\left(\frac{1}{n^2+n^{-2}}\right)$ as $n \to \infty$
(c) $2^{-n} = o\,(1/n!)$ as $n \to \infty$
(d) $5^{-\frac{1}{n}} = o(5^{-n})$ as $n \to \infty$
(e) none of the above is true

3. Which one of the following sequences diverges to $-\infty$ as $n \to \infty$?

(a) $3^n - n^2 3^{n/2}$
(b) $e^{3n} - 3n^3 e^{n/3}$
(c) $\sqrt[3]{n} - 3\sqrt{n}$
(d) $3^{1/n} - 3^{-1/n}$
(e) none of the above sequences diverges to $-\infty$

4. Which one of the following statements holds true?

(a) $s_n \to \ell$, $t_n \to +\infty \Rightarrow s_n t_n \to +\infty$ as $n \to \infty$
(b) $s_n \to 0$, $t_n \to +\infty \Rightarrow s_n t_n \to 0$ as $n \to \infty$
(c) s_n is bounded, $t_n \to +\infty \Rightarrow s_n t_n \to +\infty$ as $n \to \infty$
(d) s_n is bounded, $t_n \to 0 \Rightarrow s_n t_n \to 0$ as $n \to \infty$
(e) none of the above is true

END OF TEST