Course	Student ID	Test
1C	87654321	QUIZ 1

Question	2a	2b	2c	2d
Points	1	1.5	1	0
	MAX: 2	MAX: 1.5	MAX: 1	MAX: 2

Question	2e	3a	3b	3c
Points	1	4	8	6
	MAX: 2.5	MAX: 5	MAX: 10.5	MAX: 7.5

Total	22.5
	MAX: 32

Self Assessment [3 POINTS]

Based on your work on the prerequisites review packet and your performance on this test, what prerequisite skills should you improve on ?

WRITING GENERAL FORMULA OF SEQUENCE / Σ NOTATION

WRITING LIMITS OF FUNCTION COMPOSITION

PROVING EXPRESSIONS ARE POSITIVE OR NEGATIVE

ALSO, USING n, x PROPERLY

[2][a] $\left\{\frac{3}{2}, \boxed{\frac{1}{4}, -\frac{1}{8}, -\frac{3}{16}}, -\frac{5}{32}, \ldots\right\}$ (1)

[b] $\boxed{\frac{3}{2} > \frac{1}{4}}$ (½)

$\frac{1}{4} > -\frac{1}{8}$

$-\frac{1}{8} > -\frac{3}{16}$

$\boxed{-\frac{3}{16} < -\frac{5}{32}}$ (½)

$\boxed{\text{NOT MONOTONIC}}$ (½)

[c] $\frac{3}{2} + \frac{1}{4} = \frac{7}{4} - \frac{1}{8} = \frac{13}{8} - \frac{3}{16} = \frac{23}{16} - \frac{5}{32} = \frac{41}{32}$

(1) $\left\{\boxed{1\frac{1}{2}, 1\frac{3}{4}, 1\frac{5}{8}, 1\frac{7}{16}, 1\frac{9}{32}}, \ldots\right\}$

[d] $S_n = 1 + \frac{n+2}{2^n}$

[e] $\lim_{x\to\infty} \frac{x+2}{2^x} \overset{\frac{\infty}{\infty}}{=} \lim_{x\to\infty} \frac{1}{2^x \ln 2} = \boxed{0}$ (½)

$\boxed{\lim_{n\to\infty} \left(1 + \frac{n+2}{2^n}\right) = 1}$ (½)

$\sum_{n=1}^{\infty} a_n = 1$

[3] [a] $\lim_{x\to\infty} \frac{1}{\tan^{-1} e^x} = \lim_{t\to\infty} \frac{1}{\tan^{-1} t} = \lim_{y\to\frac{\pi}{2}} \frac{1}{y} = \frac{2}{\pi}$ (½) (½) (½)

(½) $\lim_{n\to\infty} \frac{1}{\tan^{-1} e^n} = \frac{2}{\pi} \neq 0$ (½)

(½) $\sum_{n=1}^{\infty} \frac{1}{\tan^{-1} e^n}$ DIV (DIVERGENCE) (1)

[b] $-1 < \sin n < 1 \longrightarrow 0 \leq \sin^2 n < 1$ (½)

(½) $0 \leq \frac{\sin^2 n}{8^n - 4} < \frac{1}{8^n - 4}$ (1)

(½) $\lim_{n\to\infty} \frac{1}{8^n - 4} \cdot \frac{8^n}{1} = \lim_{n\to\infty} \frac{8^n}{8^n - 4} = \lim_{n\to\infty} \frac{8^n \ln 8}{8^n \ln 8} = 1 \neq 0$ (½) (½)

(½) $\sum_{n=1}^{\infty} \frac{1}{8^n}$ CONV (GEOMETRIC (½), $|r| = \frac{1}{8} < 1$) (½)

(½) $\sum_{n=1}^{\infty} \frac{1}{8^n - 4}$ CONV (LIMIT COMPARISON) (1)

(½) $\sum_{n=1}^{\infty} \frac{\sin^2 n}{8^n - 4}$ CONV (COMPARISON) (1)

[c] (1) $\frac{\sqrt{1000n^6 + n^7}}{n^4 - n^2 - 6} \geq \frac{\sqrt{n^7}}{n^4} = \frac{1}{n^{\frac{1}{2}}} > 0$ (½) FOR $n \geq 2$ (½)

(½) $\sum_{n=2}^{\infty} \frac{1}{n^{\frac{1}{2}}}$ DIV (p-SERIES (½), $p = \frac{1}{2} \leq 1$) (½)

(½) $\sum_{n=2}^{\infty} \frac{\sqrt{1000n^6 + n^7}}{n^4 - n^2 - 6}$ DIV (COMPARISON) (1)

(½) $\sum_{n=1}^{\infty} \frac{\sqrt{1000n^6 + n^7}}{n^4 - n^2 - 6} = -\frac{\sqrt{1001}}{6} + \sum_{n=2}^{\infty} \frac{\sqrt{1000n^6 + n^7}}{n^4 - n^2 - 6}$ DIV (½)