MATH 114 – QUIZ 9 – 28 MARCH 2013

Answer all of the following questions in the space provided. Show all work as partial credit may be given. Answers without justification, even if they are correct, will earn no credit.

1. (5 pts.) Let $\{a_n\}_{n=1}^{\infty}$ be given by $a_n = \dfrac{n}{3n^2-1}$ Write down the first three terms in the sequence. (For a bonus point, find $\lim_{n\to\infty} a_n$.)

$a_1 = \frac{1}{2}$ $a_2 = \frac{2}{11}$ $a_3 = \frac{3}{26} \approx .12$

$\lim_{n\to\infty} a_n = \lim_{n\to\infty} \frac{n}{3n^2-1} = 0.$

2. (5 pts.) Consider the series $\sum_{n=1}^{\infty} \dfrac{n}{3n^2-1}$. Write down the first three terms in the sequence of partial sums for this series.

$S_1 = \frac{1}{2}$

$S_2 = \frac{1}{2} + \frac{2}{11} = \frac{15}{22} \approx .68$

$S_3 = \frac{1}{2} + \frac{2}{11} + \frac{3}{26} = \frac{114}{143} \approx .80$

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1. (5 pts.) Let $\{a_n\}_{n=1}^{\infty}$ be given by $a_n = \dfrac{n}{3+2^n}$ Write down the first three terms in the sequence. (For a bonus point, find $\lim_{n\to\infty} a_n$.)

$a_1 = \frac{1}{5} \quad a_2 = \frac{2}{7} \quad a_3 = \frac{3}{11}$

$\lim_{n\to\infty} a_n = 0$

2. (5 pts.) Consider the series $\sum_{n=1}^{\infty} \dfrac{n}{3+2^n}$. Write down the first three terms in the sequence of partial sums for this series.

$S_1 = \frac{1}{5} = 0.20$

$S_2 = \frac{1}{5} + \frac{2}{7} = \frac{17}{35} \approx .49$

$S_3 = \frac{1}{5} + \frac{2}{7} + \frac{3}{11} = \frac{292}{385} \approx .76$

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1. (5 pts.) Let $\{a_n\}_{n=1}^{\infty}$ be given by $a_n = \frac{n^2}{2^n}$ Write down the first three terms in the sequence. (For a bonus point, find $\lim_{n\to\infty} a_n$).

$a_1 = \frac{1}{2}$ $a_2 = 1$ $a_3 = \frac{9}{8} = 1.125$

$\lim_{n\to\infty} \frac{n^2}{2^n} = 0$

2. (5 pts.) Consider the series $\sum_{n=1}^{\infty} \frac{n^2}{2^n}$. Write down the first three terms in the sequence of partial sums for this series.

$S_1 = \frac{1}{2} = 0.5$

$S_2 = \frac{1}{2} + 1 = \frac{3}{2} = 1.5$

$S_3 = \frac{1}{2} + 1 + \frac{9}{8} = \frac{21}{8} = 2.625$