Name: Key Date: Score: ___/100

Pre-Calculus
Practice Test, L. 13.4 to 13.6, V2

1. Evaluate $\lim_{n\to\infty} \frac{-n^2+5}{4n^2+3n}$. $= \frac{-1}{4}$

2. Evaluate $\lim_{n\to\infty} (0.5)^n$. $= 0$

3. Evaluate $\lim_{n\to\infty} \frac{\sqrt{n}}{\sqrt{16n}}$. $= \frac{1}{4}$

4. Evaluate $\lim_{n\to\infty} \frac{2n^3+4^2n+15}{n^6-7n^3-1}$. $= 0$

5. Evaluate $\lim_{n\to\infty} \frac{2n^2+n+9}{5-3n}$. $= \infty$

6. Find the sum of the infinite geometric series $12-4+\frac{4}{3}-\frac{4}{9}\ldots$

$r = \frac{-1}{3}$ $S_n = \frac{12}{1-(\frac{-1}{3})} = \frac{12}{4/3} = 12\cdot\frac{3}{4} = 9$

Pre-Calculus

Find the interval of convergence for the geometric series.

7. $(2x+1)+\frac{(2x+1)^2}{2}+\frac{(2x+1)^3}{4}+\frac{(2x+1)^4}{8}+\ldots$

$r=\frac{2x+1}{2}$ $\quad \left|\frac{2x+1}{2}\right|<1$ $\quad \frac{2x+1}{2}<1$ $\quad \frac{2x+1}{2}>-1$

$2x+1<2$ $\quad 2x+1>-2$

$2x<1$ $\quad 2x>-3$

$x<\frac{1}{2}$ $\quad x>-\frac{3}{2}$

$-\frac{3}{2}<x<\frac{1}{2}$

Find the fraction for each of the following decimals using an infinite geometric series.

8. 0.22222222...

$0.2+0.02+0.002+\ldots$

$r=0.1$ $\quad S_n=\frac{0.2}{1-0.1}=\frac{0.2}{0.9}=\frac{2}{9}$

9. 0.153153153...

$0.153+0.000153+\ldots$

$r=0.001$ $\quad S_n=\frac{0.153}{1-0.001}=\frac{0.153}{0.999}$

$\frac{153}{999}=\frac{51}{333}=\frac{17}{111}$

Write each series in expanded form.

10. $\sum_{k=1}^{5}4k$ $\quad 4(1)+4(2)+4(3)+4(4)+4(5)$

$4+8+12+16+20$

11. $\sum_{j=3}^{6}(-2)^{j+1}$ $\quad (-2)^{3+1}+(-2)^{4+1}+(-2)^{5+1}+(-2)^{6+1}$

$16+-32+64+-128$

Express each series using sigma notation.

12. $5+10+17+26+37$

$\sum_{k=1}^{5}k^2+2k+2$

13. $\frac{1}{4}+\frac{2}{3}+\frac{3}{2}+\frac{4}{1}$

$\sum_{k=1}^{4}\frac{k}{5-k}$

14. Evaluate $\sum_{k=1}^{55}2k(k-1)$. $\quad \sum_{k=1}^{55}2k^2-2k$

$2\left(\frac{55(56)(111)}{6}\right)-2\left(\frac{55(56)}{2}\right)=110,880$

Properties of Finite Sums

$\sum_{i=1}^{n}k=\frac{n(n+1)}{2}$

$\sum_{i=1}^{n}k^2=\frac{n(n+1)(2n+1)}{6}$

$\sum_{i=1}^{n}k^3=\left[\frac{n(n+1)}{2}\right]^2$