

Exam 2 Review- 10.1-10.6

Topics Covered:		
Sequences	Telescoping Series	Helpful Intuition
N-th term test	Integral Test	Root Test
Geometric Series	Comparison Test	Ratio Test
P-series	Limit Comparison Test	Alternating Series

1. For the follow sequences, evaluate the limit. Justify mathematically.

$$\lim_{n \rightarrow \infty} \frac{13n^2 + 7\sqrt{n}}{27n^2 + 6n + 1}$$

$$\lim_{n \rightarrow \infty} \frac{-17n^{27} + 5\sqrt{n}}{3n^{26} + 2n^{25} + 1}$$

$$\lim_{n \rightarrow \infty} \frac{7n^3 + 1}{7n^4 + 7n^3}$$

2.

Series			
$\sum_{n=1}^{\infty} \frac{1}{n^2}$	AC	CC	DVG
$\sum_{n=1}^{\infty} \frac{(-1)^n}{n^2}$	AC	CC	DVG
$\sum_{n=1}^{\infty} \frac{1}{n}$	AC	CC	DVG
$\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$	AC	CC	DVG
$\sum_{n=2}^{\infty} \frac{1}{\ln(n)}$	AC	CC	DVG
$\sum_{n=2}^{\infty} \frac{(-1)^n}{\ln(n)}$	AC	CC	DVG
$\sum_{n=1}^{\infty} \frac{1}{e^n}$	AC	CC	DVG
$\sum_{n=1}^{\infty} \frac{(-1)^n}{e^n}$	AC	CC	DVG

2. $\sum_{n=1}^{\infty} (-1)^n \frac{n^4}{6n^4 + 5n^3}$. AC, CC, or dvg?

3. Let $a_n = \frac{n!}{(2n-1)!}$. Find an expression for $\frac{a_{n+1}}{a_n}$ that does not have a factorial sign.

Then consider $\sum_{n=1}^{\infty} (-1)^n \frac{n!}{(2n-1)!}$. Is it AC, CC, or dvg? Specify reasoning.

4. $\sum_{n=1}^{\infty} \frac{n}{n^2+1}$. AC, CC, or dvg?

5. $\sum_{n=1}^{\infty} 5^{-n}$. AC, CC, or dvg?
6. $\sum_{n=1}^{\infty} \frac{1}{n^2+3n+2}$. AC, CC, or dvg?
7. $\sum_{n=1}^{\infty} \frac{(n-1)!}{(n+2)!}$. AC, CC, or dvg? Solve using the LCT.
8. $\sum_{n=2}^{\infty} \frac{n}{(\ln n)^{n/2}}$. AC, CC, or dvg?