MATH 2300-005 QUIZ 6 Name: ____________________

Due Tuesday, October 4th at the beginning of class. Please use additional paper as necessary to submit CLEAR and COMPLETE solutions.

Determine whether the sequence converges or diverges. If it converges, find its limit.

1. $a_n = \dfrac{3^{n+2}}{5^n}$

2. $a_n = \sqrt{\dfrac{n+1}{9n+1}}$

3. $a_n = \dfrac{e^n + e^{-n}}{e^{2n} - 1}$

4. $a_n = \dfrac{(-3)^n}{n!}$

5. $a_n = \ln(2n^2+1) - \ln(n^2+1)$

6. $a_n = \dfrac{\sin(2n)}{1+\sqrt{n}}$

Determine whether the series is convergent or divergent. If it converges find the sum.

1. $\displaystyle\sum_{n=1}^{\infty} \frac{1+2^n}{3^n}$

2. $\displaystyle\sum_{n=1}^{\infty} \frac{1+3^n}{2^n}$

3. $\displaystyle\sum_{n=2}^{\infty} \frac{2}{n^2-1}$

4. $\displaystyle\sum_{n=1}^{\infty} \ln\left(1+\frac{1}{n}\right)$

5. $\displaystyle\sum_{n=1}^{\infty} \frac{n(n+2)}{(n+3)^2}$

6. $\displaystyle\sum_{n=1}^{\infty} [(0.8)^{n-1}-(0.3)^n]$

1. [section 8.1, problem 55] Let $a_1 = 1$, $a_{n+1} = 3 - \frac{1}{a_n}$. Show that a_n is increasing and bounded above by 3 (so that $\lim_{n\to\infty} a_n$ exists). Find the limit.

2. [section 8.2, problem 58] See the text for the problem statement.