Math 001A Assignment 11.1 Name:______________________________

**DIRECTIONS** To receive full credit, you must provide complete legible solutions to the following problems in the space provided. No Attached papers. Transfer all your answers to the space provided.

1. Find a formula for the general term an of the sequence, assuming that the pattern of the first few terms continues. (Assume that n begins with 1.) Ans:______________

$$\left\{-4, \frac{8}{3}, -\frac{16}{9}, \frac{32}{27}, -\frac{64}{81}, \ldots\right\}$$

2. Determine whether the sequence converges or diverges. If it converges, find the limit. Be sur to use limit laws to prove your answer. Ans:

a. $a_n = \dfrac{3^{n+1}}{4^n}$

b. $a_n = \tan\left(\dfrac{3n\pi}{1+12n}\right)$ Ans:________

c. $a_n = \dfrac{5n!}{2^n}$ Ans:________

3. Use Calculus to prove that the given sequences are eventually monotone increasing or monotone decreasing or neither. And write the first five terms of the convergent subsequence.

a. $$\left\{ \frac{n^2}{n^2-1} \right\}_{n=2}^{\infty}$$

b. $$\left\{ \frac{n!}{5^n} \right\}_{n=1}^{\infty}$$

c. $$\left\{ \frac{\sqrt{4n^2+9}}{n} \right\}_{n=1}^{\infty}$$

4. Use the rigorous definition of a limit of a sequence to prove the limit statement.

$$\lim_{n\to\infty}\left(\frac{n-1}{n}\right)=1$$