Name: Solutions

Quiz No. 4

Sections 1202,1203

2/21/19

1. (5 pts.) Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues.

$$\{-1, \frac{3}{2}, \frac{-5}{6}, \frac{7}{24}, \frac{-9}{120}, \frac{11}{720}, ...\}$$

$a_1 \; a_2 \; a_3 \; a_4 \; a_5 \; a_6$

$$(-1)^n \frac{2n-1}{n!}$$

2. (5 pts.) Determine whether the sequence converges or diverges. If it converges, find the limit.

$$a_n = \frac{3^n}{n^3}$$

$$f(x) = \frac{3^x}{x^3}$$

L'Hospital's Rule 3 times.

$$\lim_{x\to\infty} \frac{3^x}{x^3} = \lim_{x\to\infty} \frac{3^x \ln 3}{3x^2} = \lim_{x\to\infty} \frac{3^x \ln 3 \ln 3}{6x} = \lim_{x\to\infty} \frac{3^x \ln 3 \ln 3 \ln 3}{6} = \infty$$

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

3. (2 pts. extra credit) Determine whether the sequence converges or diverges. If it converges, find the limit.

$$a_n = e^{\frac{2n}{(n+1)^2}}$$

$$\lim_{n\to\infty} \frac{2n}{(n+1)^2} = \lim_{n\to\infty} \frac{2n}{n^2+2n+1} = \lim_{n\to\infty} \frac{2}{n+2+1/n} = 0$$

So $\lim_{n\to\infty} a_n = e^0 = 1$