MAT 137 (Calculus II) Prof. Swift

Worksheet on Sequences

1. Write down the first 4 terms of the sequence $\{(-1)^n n^2\}_{n=1}^{\infty}$. Give your answer by filling in the blanks: $\{(-1)^n n^2\}_{n=1}^{\infty} = \{$ -1 , 4 , -9 , 16 , $\ldots\}$.

2. Suppose the first few terms of a sequence are $\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \ldots\}$. Find a possible formula for a_n such that $\{a_n\}_{n=1}^{\infty} = \{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \ldots\}$. $a_n = \frac{n}{n+1}$

What is the limit of the sequence? $\lim_{n\to\infty} a_n =$ 1

3. An arithmetic sequence satisfies $a_{n+1} = a_n + c$ for all n, where c is a constant. Fill in the blanks, assuming the following is an arithmetic sequence: $\{3, 1,$ -1 , -3 , -5 , $\ldots\}$.
$c = 1 - 3 = -2$

4. A geometric sequence satisfies $a_{n+1} = r \cdot a_n$ for all n, where r is a constant. Fill in the blanks, assuming the following is a geometric sequence: $\{3, 1,$ $\frac{1}{3}$, $\frac{1}{9}$, $\frac{1}{27}$, $\ldots\}$.
$r = \frac{1}{3}$

5. Guess the limit of the sequence $\{a_n\}_{n=1}^{\infty} = \{3, 3.1, 3.14, 3.141, 3.1415, 3.14159, \ldots\}$.
$\lim_{n\to\infty} a_n =$ π
$a_n = \pi$ rounded with n total digits.