AP Calculus Homework 22

Please write your answer on a separate piece of paper and submit it on Classkick or write your answer directly on Classkick.

1. List the first five terms of the sequence.

a) $a_n = \dfrac{3(-1)^n}{n!}$ b) $\{2 \cdot 4 \cdot 6 \cdot \cdots \cdot (2n)\}$

2. Find a formula for the general term a_n of the sequence, assuming that the pattern of the first few terms continues.

a) $\{1, \frac{1}{3}, \frac{1}{5}, \frac{1}{7}, \frac{1}{9}, ...\}$ b) $\{2, 7, 12, 17, ...\}$ c) $\{1, -\frac{2}{3}, \frac{4}{9}, -\frac{8}{27}, ...\}$

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

a) $a_n = 1 - (0.2)^n$ b) $a_n = \dfrac{3 + 5n^2}{n + n^2}$ c) $a_n = \dfrac{(-1)^{n-1}n}{n^2 + 1}$

d) $a_n = \cos(n/2)$ e) $\left\{ \dfrac{e^n + e^{-n}}{e^{2n} - 1} \right\}$ f) $\{n^2 e^{-n}\}$

g) $a_n = n \sin(1/n)$ h) $a_n = \sqrt[n]{2^{1+3n}}$ i) $a_n = \dfrac{(\ln n)^2}{n}$

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

4. Determine whether the sequence is increasing, decreasing, or not monotonic. Is the sequence bounded?

a) $a_n = \dfrac{1}{2n + 3}$ b) $a_n = n(-1)^n$ c) $a_n = \dfrac{n}{n^2 + 1}$

5. Find the limit of the sequence

$$\left\{ \sqrt{2}, \sqrt{2\sqrt{2}}, \sqrt{2\sqrt{2\sqrt{2}}}, ... \right\}$$

6. Determine whether the geometric series is convergent or divergent. If it's convergent, find its sum.

a) $3 + 2 + \frac{4}{3} + \frac{8}{9} + \cdots$ b) $\sum\limits_{n=1}^{\infty} 6(0.9)^{n-1}$ c) $\sum\limits_{n=1}^{\infty} \dfrac{e^n}{3^{n-1}}$