

DUE Friday, October 10 at the beginning of class

- For each sequence below,
 - classify it as arithmetic, geometric, or neither,
 - find a function $a(n)$ that describes the sequence,
 - determine the limit of the sequence
 - $\{2^{1/2}, 2, 2^{3/2}, 4, \dots\}$
 - $\{-27, 9, -3, 1, -\frac{1}{3}, \dots\}$
 - $\{3, \frac{7}{2}, 4, \frac{9}{2}, 5, \dots\}$
 - $\{-7, -2, 3, 8, 13, \dots\}$
 - $\{\frac{5}{4}, -\frac{5}{2}, 5, -10, \dots\}$
 - $\{k - 3, k - 7, k - 11, k - 15, k - 19, \dots\}$ where k is any real number
- Consider a sequence whose 3rd term is 13 and whose 7th term is 208.
 - Assume the sequence is arithmetic. Find the generating function $a(n)$ that describes the sequence and find the 19th term.
 - Assume the sequence is geometric. Find the generating function $a(n)$ that describes the sequence and find the 19th term.
- Consider the infinite sequence $\{\frac{3k^3}{2}, \frac{9k^4}{4}, \frac{27k^5}{8}, \frac{81k^6}{16}, \dots\}$
 - Determine the function that generates this geometric sequence
 - Determine the limit of this sequence. (Your answer will depend on the constant k .)
- Prove that the following sequences are neither arithmetic or geometric. Then find the next 4 terms of each sequence assuming the simplest pattern continues.
 - $\{2, 4, 7, 11, 16, \dots\}$
 - $\{125, 25, 5, 1, \frac{1}{5}, \dots\}$
 - $\{2, 6, 4, 9, 6, 12, \dots\}$
- Let $\{a_n\}$ and $\{b_n\}$ be convergent sequences where $\lim_{n \rightarrow \infty} a_n = c^2 - 1$, $\lim_{n \rightarrow \infty} b_n = c + 1$. For the following sequences,
 - determine what is required for the new sequence to exist

ii assume the sequence exists and compute the limit of the sequence, if it exists. Fully simplify this expression.

(a) $\{c^2b_n - a_nb_n\}$

(b) $\left\{\frac{b_n}{a_n + b_n}\right\}$

6. (a) Calculate the missing terms of the arithmetic sequence with $a_1 = 18$ and $a_6 = 48$.
(b) Find a_1 of the arithmetic sequence with $a_4 = 0$ and $a_{10} = 36$.
7. The sum of the first and third terms of a geometric sequence is 20 and the sum of the first 3 terms is 28. What is the 6th term of the sequence?
8. The seventh term of a geometric sequence is 11 and the eleventh term is 7. What is the ninth term of this sequence?