Read Module 6 material on Canvas

1. (a) If a sequence is arithmetic and starts with $3, 5$ what is the next term? Just give the answer, don't justify it.
   (b) If a sequence is geometric and starts with $3, 5$ what is the next term? Just give the answer, don't justify it.

2. Evaluate
$$\sum_{k=7}^{1000} \frac{3^{2k+4}}{2^{3k+5}}$$
algebraically. You must show all steps. Leave large powers (which is to mean expressions of the form a^b with $b \approx 1000$) un-evaluated in your final answer. Do not give a calculator approximation.

3. Suppose $\{a_n\}$ is arithmetic and $a_3 = 5$, $a_{11} = 87$.
   - What is the common difference?
   - Find the following sum:
$$\sum_{k=3}^{200} a_k$$
Show your work Leave your answer unevaluated format, don't give a calculator answer.

4. Suppose $\{a_n\}$ is geometric and $a_3 = 5$, $a_{11} = 87$. What is the ratio? Leave you answer in radical format.

5. Using the summation formula $\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$ and $j = k+1$ index shift to find the following sum:
$$\sum_{j=5}^{45} (j+1)(j-3)$$
Show you work. Leave your answer unevaluated.

6. Find a recursive definition for the following sequences defined by the closed formulas:
   (a) $a_n = -3 - 5n$
   (b) $a_n = (-5) \cdot 3^n$
   (c) $a_n = n! \cdot 2^n$.