Week 13 - Problems

For the skills homework make sure you also take the quiz labeled "Week 13 Homework Review".

1. Consider the arithmetic sequence 7, 11, 15, ..
   a. Find the formula for the $n^{th}$ term.
   b. Find the 12$^{th}$ term of the sequence.
   c. Which term equals 131?

2. Find the sum of the first 50 terms of the arithmetic sequence 1, 3, 5…

3. Find the sum: $\sum_{k=1}^{20} 50 - 2k$.

4. Consider the geometric sequence 3, 9, 27 ..
   a. Find the formula for the $n^{th}$ term.
   b. Find the 12$^{th}$ term of the sequence.
   c. Which term equals 59049?

5. Consider the geometric sequence 3, 9, 27 ..
   Find the sum of the first 10 terms.

6. Find the sum: $\sum_{k=1}^{9} (0.9)^k$

7. Assume that an arithmetic sequence $a_n$ is given. Find $a_{20}$ when $a_{14}=12$ and $a_{30}=20$.

8. Assume that a geometric sequence $a_n$ is given. Find $a_{12}$ when $a_5=8$ and $a_7=16$.

9. Find the sum of the first 14 terms of the series 11 + 7 + 3 + ..

10. Find the sum of the first 10 terms of the series 1 + 3 + 9 + 27+ ..

11. Find the sum of the first 10 terms of the series 1 – 2 + 4 – 8 + ..

12. Use an infinite geometric series to express 0.123123123…

13. Find the sum of the first 200 even natural numbers.
14. Find the sum: \[ \sum_{k=1}^{6} \frac{1}{2k+1} \]

15. Find the sum: \[ \sum_{k=5}^{250} 8k \]

16. Find the sum: \[ \sum_{r=5}^{20} 2^{-2r} \]

17. $500$ are invested at 5.5\% compounded annually. Express the value of the investment after \( n \) years as \( a_n \).

Read example 9 on page 494.

18. For 20 years $500$ are invested each year at 5.5\% compounded annually. What is the value of the total investment?

19. Find the sum of the first 10 terms in the series \[ 1 + x^5 + x^{10} + x^{15} + \ldots \]

20. Find the sum: \[ \sum_{i=0}^{\infty} \frac{3}{2} \]