

NCLS Math 7A Homework, 04/29/2012**Name:** _____**Arithmetic Series**

1. Compute the sum of each of the following arithmetic series:
 - (a) $21+28+35+\dots+105$
 - (b) The arithmetic series with first term 7, common difference -4 and 14 terms
 - (c) $\frac{1}{2} + 5/6 + 7/6 + 19/2$
2. The sum of a 15-term arithmetic series with first term 7 is -210. What is the common difference?
3. The sum of the first 5 terms of an arithmetic series is 70. The sum of the first 10 terms of this series is 210. What is the first term of the series?
4. Explain why an arithmetic series with an odd number of terms has its sum equal to the number of terms times the middle term of the series.
5. The sum of 5 consecutive even integers is 4 less than the sum of the first 8 consecutive odd positive integers. What is the smallest of the even integers?
6. If the sum of the first $3n$ positive integers is 150 more than the sum of the first n positive integers, then what is the sum of the first $4n$ positive integers?
7. Suppose that the sequence $a_1, a_2, a_3, \dots, a_{200}$ is an arithmetic sequence with $a_1 + a_2 + \dots + a_{100} = 100$ and $a_{101} + a_{102} + \dots + a_{200} = 200$. What is the value of $a_2 - a_1$?
8. The arithmetic mean can be extended to more than just two numbers. The arithmetic mean of the numbers a_1, a_2, \dots, a_n is
$$\frac{a_1 + a_2 + \dots + a_n}{n}$$
 - (a) Suppose $a_1 \leq a_2 \leq \dots \leq a_n$. Why must the arithmetic mean of the numbers a_1, a_2, \dots, a_n be at least a_1 , but no greater than a_n ?
 - (b) Suppose a_1, a_2, \dots, a_n is arithmetic sequence. Show that the arithmetic mean of all the terms in the sequence is the same as the arithmetic mean of a_1 and a_n .
9. Given a sequence $\{a_n\}$, the sum of first n terms is $S_n = \frac{1}{4}n^2 + \frac{2}{3}n + 3$. What is the formulae for a_n ? Is this an arithmetic sequence? If so, what is the initial value and common difference?
10. Given an arithmetic sequence $\{a_n\}$, S_n is the sum of first n terms. Prove that $S_6, S_{12} - S_6, S_{18} - S_{12}$ also make an arithmetic sequence.