Name_____
Date_____

Advanced Algebra
Unit 1: Sequence and Series
Assignment #5

LT: I can sum up a partial sums of an arithmetic series

Example:
$2+4+6+8+\cdots$ is an example of a arithmetic series. Notice how the terms are now separated by the addition signs instead of the commas. This is how you can identify the notation.

Find S_8. This is asking us to find the sum of the first 8 terms. Notice how we use the S when we are talking about a series. What do we use when we are talking about a sequence? _____
What is the difference between the two notations?_____

The formula for the partial sums of an Arithmetic Series is $Sn = \frac{n(U1+Un)}{2}$

So in the original example find S_8. Well $U_1 = 2$ and $U_8 = 16$ so $\frac{8(2+16)}{2}=72$

Find the sums of the given series

1) Given the series 3+6+9+... Find S_{12}

$U_1 = 3$ $\quad U_{12} = 3 + (12-1)3$ $\quad U_{12} = 36$ $\quad S_{12} = \frac{12(3+36)}{2} = 234$

2) Given the series 6+12+18+24+... Find S_{14}

$U_{14} = 6 + 13(6)$ $\quad U_{14} = 84$ $\quad S_{14} = \frac{14(6+84)}{2} = 630$

3) Given $U_4 = 14$ and $U_8 = 22$ Find S_{12}

$\frac{22-14}{8-4} = 2$ $\quad U_{12} = 8 + 11(2)$ $\quad U_{12} = 30$ $\quad S_{12} = \frac{12(8+30)}{2} = 228$

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$$Sn = \frac{n(U1+Un)}{2}$$

4) Given $U_3 = -15$ and $U_7 = -27$ Find S_{10}

$\frac{-27 - -15}{7-3} = \frac{-12}{4} = -3$ $U_1 = -9$ $U_{10} = -9 + 9(-3)$

$U_{10} = -36$

$S_{10} = \frac{10(-9 + -36)}{2} = -225$

5) Find $\sum_{n=1}^{10} 3x + 5$

$U_1 = 8$ $U_{10} = 35$

$S_{10} = \frac{10(8+35)}{2} = 215$

6) Find $\sum_{n=1}^{15} -2x + 8$

$U_1 = 6$

$U_{15} = -22$

$S_{15} = \frac{15(6 + -22)}{2}$ $S_{15} = -120$

7) Given the following arithmetic sequence, Find S_{60}

$$\begin{cases} U_1 = 18 \\ U_n = U_{(n-1)} + 4 \\ n \geq 2 \end{cases}$$

$y = 4x + 14$

$U_1 = 18$

$U_{60} = 254$

$S_{60} = \frac{60(18 + 254)}{2}$ 8160

8) Given the following arithmetic sequence, Find S_{52}

$$\begin{cases} U_1 = 24 \\ U_n = U_{(n-1)} - 6 \\ n \geq 2 \end{cases}$$

$y = -6x + 30$

$U_1 = 24$

$U_{52} = -282$

$S_{52} = \frac{52(24 + -282)}{2}$

$S_{52} = -6708$

Assignment #5

Unit 1: Sequence and Series Homework:

1) Given 1+2+3+4+... Find $\sum_{n=1}^{12} n$ (Write the recursive first, sum up the first 12 terms)

$U_1 = 1$
$U_n = U_{(n-1)} + 1$ $n \geq 2$ → $y = 1x + 0$

$\sum_{n=1}^{12} n \quad S_{12} = \frac{12(1+12)}{2} = 78$

2) Find S_{10} given 2,6,10,14,18,...

$U_1 = 2$
$U_n = U_{(n-1)} + 4$
$n \geq 1$
$y = 4x - 2$

$S_{10} = \frac{10(2+38)}{2} = 200$

3) Find U_{75} if Un= 2n-1

U_{75} Means 75th Term

$2(75) - 1$ 149

4) Find $\sum_{n=1}^{75}(2n-1)$

$S_{75} = \frac{75(1+149)}{2} = 5625$

5) Find $\sum_{n=20}^{75}(2n-1)$ (Hint: Find S_{75} and subtract S_{19})

I need to do $\sum_{n=1}^{75} 2n-1 - \sum_{n=1}^{19} 2n-1$

$S_{19} = \frac{19(1+37)}{2}$

$S_{19} = 361$

$S_{75} = 5625$

$5625 - 361 = 5264$

This is what the sum is from U_{20} to U_{75}