11.2 Part 2

NAME _____ DATE _____

Reteaching Worksheet

Arithmetic Series

The indicated sum of the terms of a sequence is called a **series.** The symbol S_n is used to represent the sum of the first n terms of a series. Since $a_n = a_1 + (n - 1)d$, substitute this into the formula $S_n = \frac{n}{2}(a_1 + a_n)$ and get another formula for S_n, $S_n = \frac{n}{2}[2a_1 + (n - 1)d]$.

Sum of an Arithmetic Series

The sum, S_n, of the first n terms of an arithmetic series is given by the following formula.

$$S_n = \frac{n}{2}(a_1 + a_n).$$

Example: Find the sum of the first 20 terms of an arithmetic series where $a_1 = 10$ and $d = 3$.

$$S_n = \frac{n}{2}[2a_1 + (n - 1)d]$$
$$S_{20} = \frac{20}{2}[2(10) + (20 - 1)3]$$
$$= 770$$

Sigma notation can also be used to express an arithmetic series.

Example: Find $\sum_{k=1}^{4}(2k - 3)$.

$$\sum_{k=1}^{4}(2k - 3) = \underbrace{2(1) - 3}_{-1} + \underbrace{2(2) - 3}_{1} + \underbrace{2(3) - 3}_{3} + \underbrace{2(4) - 3}_{5}$$
$$= 8$$

Find S_n for each arithmetic series described.

1. $a_1 = 12, a_n = 100, n = 12$

2. $a_1 = 50, a_n = -50, n = 15$

3. $a_1 = 42, n = 8, d = 6$

4. $a_1 = 4, n = 20, d = 2\frac{1}{2}$

5. $8 + 6 + 4 + \ldots + -10$

6. $3 + 6 + 9 + \ldots + 99$

7. $\sum_{n=1}^{20}(2n + 1)$

8. $\sum_{n=5}^{25} x - 1$