Arithmetic Sequences and Series:

Arithmetic Sequence: A sequence having the form

$$a, a+d, a+2d, a+3d, a+4d, \ldots$$

where each term after the first differs from the preceding term by a constant amount d.

a: First term

d: Common difference

Determine if the sequence is arithmetic and if so, find the common difference:

3, 6, 9, 13, . . .   -10, -4, 2, 8, . . .   5, 8, 11, 14, . . .

Write the first 4 terms of the arithmetic sequence given that

$$a_1 = -5 \text{ and } d = 5 \qquad\qquad a_1 = \frac{3}{4} \text{ and } d = -\frac{1}{4}$$

Find the general term (nth term)of a sequence given that the sequence is arithmetic with first term a_1 and common difference d.

The nth term of an arithmetic sequence is given by:

$$a_n = a_1 + (n-1)d$$

Find the indicated term for each arithmetic sequence described below.

a_{16} where $a_1 = 9$ and $d = 9$

a_{70} where $a_1 = -32$ and $d = 4$

$2, 7, 12, 17, \ldots$ Find a_{20}

$6, 1, -4, -9, \ldots$ Find a_{20}

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

Find the sum of the first 25 terms of the arithmetic sequence: 7, 19, 31, 43, . . .

Find 2 + 4 + 6 + 8 + . . . + 200, the sum of the first 100 positive even integers.

Telephone poles are stored in a pile with 25 poles in the first layer, 24 in the second layer, and so on. If there are 12 layers, how many telephone poles does the pile contain?

Company A pays $23,000 yearly with raises of $1200 per year. Company B pays $26,000 yearly with raises of $800 per year. Which company will pay more in year 10? How much more?

A section in a stadium has 20 seats in the first row, 23 seats in the second row, increasing by 3 seats each row for a total of 38 rows. How many seats are in this section of the stadium?