The General Term of an Arithmetic Sequence

Insert 2 numbers between 2 and 20 so that the four numbers form an arithmetic sequence.

to unat the f $\begin{array}{c}
1 \\
2 \\
4 \\
4
\end{array}$ $\begin{array}{c}
2 \\
4 \\
4
\end{array}$ $\begin{array}{c}
2 \\
4 \\
4
\end{array}$ $\begin{array}{c}
4 \\
4 \\
4
\end{array}$ $\begin{array}{c}
4 \\
4 \\
4
\end{array}$ $\begin{array}{c}
4 \\
4 \\
4
\end{array}$ an equation for:

2+31=20 . 3 d = 18 d = 6

AT 6 = 8 8+6=14 2+6=8

This leads to an equation for the general term:

$$t_n = a + (n-1)d$$

where a = the first term

n = number of terms

d = common difference

Ex. 1) Given the sequence 2, 9, 16, ...

a) Determine a simplified equation for the general term.

$$t_{n} = 2 + (n-1)7$$
 $= 2 + 7n-7$
 $t_{n} = 7n-5$

b) Determine t₃₀.

$$t_{33} = 7(30) - 5$$

$$= 210 - 5 = 205$$

c) Determine t₁₀₀.

$$t_{100} = 7(100) - 5$$

$$= 700 - 5 = (695)$$

Ex. 2) - 65 is a term in the sequence 19, 13, 7, Which term is it?

$$t_{n} = 19 + (n-1)(-6)$$

$$t_{n} = 19 - 6n + 6$$

$$t_{n} = 25 - 6n$$

$$-65 = 25 - 6n$$

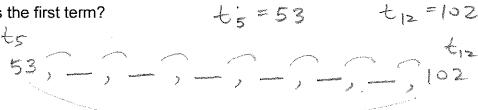
$$-25 = 25 - 6n$$

$$-10 = -60$$

Lever 15 15 - 65

Ex. 3) In an arithmetic sequence, the 5th term is 53 and the 12th term is 102.

a) What is the first term?



49=7=7 = amon difference

$$53 = \alpha + (5-1)(7)$$

$$53 = \alpha + 4(7)$$

$$53 = \alpha + 28$$

$$\alpha = 53 - 28$$

$$\alpha = 25$$

b) Write the general term.

$$t_{N} = 25 + (N-1)(7)$$

$$= 25 + 7N - 7$$

$$t_{N} = 7N + 18$$

c) How many terms in the sequence are less than 150?

Practice Work: Arithmetic Sequences Worksheet