The General Term of an Arithmetic Sequence

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

sequence.

2,8,14,20

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.

$$a=2$$
 $t_n = 2 + (n-1)7$ $= 7n-5$
b) Determine t_{30} . $t_{30} = 2 + (30-1)7$ $= 205$

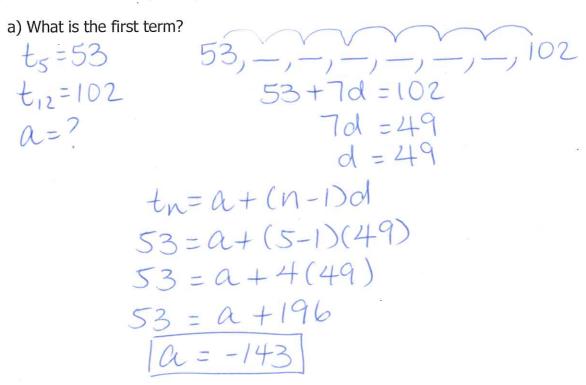
c) Determine
$$t_{100}$$
. $t_{100} = 2 + (100 - 1)7$
 $t_{100} = 695$

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

$$a=19$$
 $t_{n}=a+(n-1)d$
 $d=-6$
 $-65=19+(n-1)(-6)$
 $n=7$
 $-84=-6(n-1)$
 $14=n-1$
 $n=15$

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



b) Write the general term.

$$t_{n} = -143 + (n-1)(49)$$

$$= -143 + 49n - 49$$

$$= 49n - 192$$

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

$$t_{n}=150 \text{ n}=?$$
 $150=-143+(n-1)(49)$
 $293=(n-1)(49)$
 $5.9796=n-1$
 $n=6.9796$
6 terms