Finding The nth Term In A Sequence:

A. Many times instead of finding the next term in a sequence you are asked to find a specific term in a sequence. For problems like this use the following:

1. When asked this question, almost all the sequences will be adding a fixed number to each successive term. (See *Finding The Next Term part C*)

2. This problem I always approach from a logic standpoint.

3. Ask yourself, what should the first term be? (This is 'a'.) This is always equal to the fixed number that is being added.

4. Now, how can I change the number in step 3 (by adding or subtracting a number) to equal the first term? (This is 'b'.)

5. Now, make an expression for the nth term using the above information:

$$an + b$$

Ex [1] Find the 11th term of the sequence 4, 7, 10,...

a. Notice that 3 is being added to all numbers, so the first term should be 3, then 6, then 9, etc.

b. You need to add 1 to 3 to equal 4.

c. So the expression is $3n + 1$.

d. The answer is $3(11) + 1$ or 34.

Ex [2] Find the 8th term of the sequence -2, 0, 2,...

a. In this case 'a' is 2. So normally we would count: 2,4,6,etc. So the first term should be 2.

b. If we subtract 4 from 2 we get -2.

c. So the expression is $2n - 4$.

d. The answer is $2(8) - 4$ or 12.

Ex [3] Find the 40th term in the sequence 1, 7, 13,...

a. In this case 'a' is 6. So the first term should be 6.

b. If we subtract 5 from 6 we get 1.

c. So the expression is $6n - 5$.

d. The answer is $6(40) - 5$ or 235.

B. Sometimes the question is turned around and asks what term a certain number is in a
    sequence.

    1. We can use the same logic as above to come up with an expression.

    2. Find the expression for the nth term of the sequence (same as above).

    3. Solve for n: $an + b = x$, where x is the given number.

      Ex [4] 58 is what term in the sequence 1, 4, 7,...

        a. Since we are adding by 3, 3 should be the first number.

        b. If we subtract 2 from 3 we get 1.

        c. So the expression is $3n - 2$.

        d. Solve: $3n - 2 = 58$.

        e. The answer is 20.

      Ex [5] 105 is what term in the sequence 9, 13, 17,...

        a. Since we are adding by 4, the first number should be 4.

        b. If we add 5 to 4 we get 9.

        c. So the expression is $4n + 5$.

        d. Solve: $4n + 5 = 105$.

        e. The answer is 25.