17.2 Number 9 a-c

For all the parts in this problem, we will use the following formula:

$$t_n = t_1 + (n-1)d$$

because this formula calculates the nth term in a sequence, I call it the "last term formula" or the "nth term formula"

a. The problem asks us to find the 6th term in the sequence, so we know that n = 6
We also know that 2, 7, and 12 (the given values) are all sitting 5 integers apart on a number line (starting at 2 you add 5 to get 7, then you have to add 5 to get 12, and because it is an arithmetic sequence, meaning that all the terms have the same something added or subtracted to/from them that all the other terms in the sequence will be separated from each other by 5 as well. That makes the common difference, or "d" equal to 5
We also know that the first term is 2. $t_1 = 2$
We can plug this into our formula to get this:
$$t_6 = 2 + (6-1)(5)$$
Solving this formula, we find that
$$t_6 = 2 + (5)(5) = 2 + 25 = 27$$

So the 6th term in this sequence is 27.

b. The problem asks us to find the 10th term in the sequence, so we know that n = 10
The common difference, or "d" equal to 9 (because each number is 9 higher than the one before it)
We also know that the first term is 16. So $t_1 = 16$
We can plug this into our formula to get this:
$$t_{10} = 16 + (10-1)(9)$$
Solving this we get:
$$t_{10} = 16 + (9)(9) = 16 + 81 = 97$$
So the 10th term in this sequence is 97.

c. The problem asks us to find the 21st term in the sequence, so we know that n = 21
The common difference, or "d" equal to -3 (because each term goes down by 3) So d = -3
We also know that the first term is 92. So $t_1 = 92$
We can plug this into our formula to get this:

$$t_{21} = 92 + (21 - 1)(-3) = 92 - (21 - 1)(3)$$
$$= 92 - (20)(3) = 92 - 60 = 32$$

So the 21st term in this sequence is 32

Notice that when you come across sequences where the numbers are progressively getting smaller instead of larger, that the common difference is a negative number. This means that your "last term formula" is going to subtract instead of add.