Determining Missing Terms in a Sequence

You have learned how to use common differences and ratios to determine what terms come next in a sequence. Today, we are going to use the first and the last term of an **arithmetic** sequence to determine the terms in the middle. If you know the total change (the end value minus the start value) and the number of changes from the starting value(the number of terms minus 1), then you can determine the common difference in **arithmetic** sequences. To find the common difference, all you have to do is divide the total change by the number of changes. Then, once you have the common difference, simply add it to the first term to get the second. Add it to the second to get the third, and so on until the sequence is complete.

Determine the missing terms in each **arithmetic** sequence.

EXAMPLE	EXAMPLE	EXAMPLE
8, ___, ___, ___, -8 *1st, determine the number of changes:* *5 terms mean **4** changes from the start* *2nd, determine the total change:* *end - start = -8 – 8 = **-16*** *To find each change, divide those two numbers:* $\frac{total\ change}{number\ of\ changes} = -\frac{16}{4} = -4$ $8 - 4 = 4$ *(use this to find the next…)* $… 4 - 4 = 0$ *(and the next…)* $… 0 - 4 = -4$ *(which leads to the end)* $… -4 - 4 = -8$ $8, \boxed{4, 0, -4}, -8$	16, ___, ___, ___, ___, 46 *number of changes:* **5** *total change:* $46 - 16 = $ **30** *each change:* $\frac{30}{5} = 6$ $16 + 6 = 22$ $… 22 + 6 = 28$ $… 28 + 6 = 34$ $… 34 + 6 = 40$ $… 40 + 6 = 46$ $16, \boxed{22, 28, 34, 40,} 46$	-3, ___, ___, ___, 37 *number of changes:* **4** *total change:* $37 - -3 = $ **40** *each change:* $\frac{40}{4} = 10$ $-3 + 10 = 7$ $… 7 + 10 = 17$ $… 17 + 10 = 27$ $… 27 + 10 = 37$ $-3, \boxed{7, 17, 27,} 37$
1. 5, ___, ___, ___, 17	2. -9, ___, ___, 24	3. 14, ___, ___, ___, -18
4. 12, ___, ___, ___, ___, 37	5. 6, ___, 18	6. 11, ___, ___, ___, -13

7. -20, ___, ___, -14	8. 18, ___, ___, ___, ___, ___, ___, 95	9. 10, ___, ___, ___, ___, ___, ___, ___, ___, -8
10. -9, ___, 31	11. -12, ___, ___, -54	12. -2, ___, ___, 52
13. 0, ___, ___, ___, -28	14. -4, ___, ___, ___, ___, 1	15. -12, ___, ___, ___, 8
16. -10, ___, ___, ___, ___, 5	17. 14, ___, 26	18. -15, ___, ___, 18