1. Find the indicated term of each sequence. (Show work to help you remember how when you're studying later.)
   (a) 657th term of $140, 131, 122, 113, 104, \ldots$
   (b) 58th term of $2, 16, 128, 1024, \ldots$
   (c) 207th term of $91, 95, 99, 103, \ldots$
   (d) 2604th term of $\frac{1}{7}, 3, 63, 1323, \ldots$
   (e) 1355th term of $x, y, z, w, 2, 3, x, y, z, w, 2, 3, x, \ldots$
   (f) 1923rd term of $18, 35, 52, 69, \ldots$
   (g) 490th term of $5, -15, 45, -135, \ldots$
   (h) 946th term of $2, 3, 2, 5, 6, 7, 8, 2, 3, 2, 5, 6, 7, 8, 2 \ldots$
   (i) 14001st term of $a, b, c, a, b, c, a, \ldots$
   (j) 514th term of $1200, 120, 12, 1.2, \ldots$
   (k) 870th term of $1200, 300, 75, 18.75, \ldots$
   (l) 45602nd term of $17, 20, 23, 26, \ldots$

2. For each finite arithmetic sequence below, tell how many terms have been represented altogether. Show work for easier remembering and explaining later.
   (a) $2, 4, 6, \ldots, 1490$
   (b) $182, 184, 186, \ldots, 1490$
   (c) $61, 76, 91, \ldots, 2566$
   (d) $832, 838, 844, \ldots, 31582$
   (e) $542, 537, 532, \ldots, 312$
   (f) $6241, 6230, 6219, \ldots, 4272$
   (g) $(-12), (-10), (-8), \ldots, 82$
   (h) $(-147), (-141), (-135), \ldots, 441$

3. Determine whether the given number will appear in the sequence, and if so, at what position; explain your solutions.
   (a) 3861 in $91, 95, 99, 103, \ldots$?
   (b) 207 in $91, 95, 99, 103, \ldots$?
   (c) 1923 in $18, 35, 52, 69, \ldots$?
   (d) 42654 in $18, 35, 52, 69, \ldots$?
   (e) -625 in $140, 131, 122, 113, 104, \ldots$?
   (f) -1500 in $2305, 2299, 2293, 2287, \ldots$?

1. (a) $140 + (-9) \cdot 656 = -5764$ – Explanation: We need 656 new terms after the first term, so that makes 656 CDs after/added onto the first term, since you add one CD every time you want to make one new term from the previous term.
   (b) not arithmetic
   (c) $91 + 4 \cdot 206 = 915$ – Explanation: We need 206 NEW terms after the first term, so we have to add 206 CDs onto the first term, since every CD makes a new term.
   (d) not arithmetic
   (e) not arithmetic
   (f) $18 + 17 \cdot 1922 = 32692$ – PARTIAL Explanation: We need another 1922 new terms after the first term, so we'll have to add 1922 CDs onto that first term.
   (g) not arithmetic
   (h) not arithmetic
   (i) not arithmetic
   (j) not arithmetic
   (k) not arithmetic
   (l) $17 + (3) \cdot 45601 = 136820$ – PARTIAL Explanation: We need 45601 NEW terms AFTER the first term, so we need 45601 CDs after/added onto the first term.

2. (a) SOLUTION: From 2 to 1490 is a total difference (distance) of 1488, and there are $1488/2 = 744$ CDs of 2 in that stretch. Since every CD makes a new term after the first term, there are 744 new terms AFTER the first one. Including the first term in this count gives 745 terms altogether.
   (b) SOLUTION: From 182 to 1490 is a total difference (distance) of 1308. Our common difference CDs are worth 2 apiece, so there are $1308/2 = 654$ CDs in the portion of the sequence shown. Every CD creates a new term past the first term, so there were 654 new terms created. When we also count the original first term, - which isn't created by adding - there are 655 terms represented.
   (c) SOLUTION: 61 to 2566 is a stretch of 2505. Each CD is worth 15, so the total difference can be broken up into $2505/15 = 167$ CDs. Every CD represents creating a new term beyond the first term, so we have 167 new terms here, not counting the first term. Including a_1 in our count, we have 168 terms represented.
   (d) SOLUTION: 832 to 31582 is a total difference of 30750, which contains $30750 \div 6 = 5125$ CDs that are worth 6 apiece. That means we have 5125 new terms created after the first term. Include the first term in our total count to get 5126 terms altogether.
   (e) SOLUTION: 542 DOWN to 312 is a stretch of 230. It turns out that we don't need to worry about the sign: even if we think of the list as running from 312 UP to 542, there will be the same number of terms either way. Each CD is worth -5 originally, but we can ignore the sign: there are $230 \div 5 = 46$ CDs going on no matter which direction our sequence reads, and every CD makes a new term after the first term. 46 new terms plus 1 first term equals 47 terms total.
   (f) SOLUTION: 6241 down to 4272 is a total change of 1969, and the direction doesn't matter in our counting situation, as above. We have $1969 \div 11 = 179$ CDs represented in the change, so 179 new terms after the first term, plus counting the first term gives 180 terms total.
   (g) SOLUTION: (-12) to 82 is a total difference of 94. The CD is 2, and there are 47 of them in that total difference. 47 CDs means 47 new terms being counted AFTER the first term. Count the first term also, so you have 48 terms altogether.
   (h) SOLUTION: (-147) to 441 has a total difference of 588. There are $588 \div 6 = 98$ CDs in that difference, which means that 98 terms have been created, not counting the first term. When you count it, you have 99 terms altogether.

3. (a) Solution: The total difference from 91 to 3861 is $3861 - 91 = 3770$. We can't cover that distance in jumps of adding 4 each time ($3770 \div 4$ doesn't give a whole number answer), so no, 3861 won't show up in that sequence.

(b) Solution: The total distance from 91 to 207 is $207 - 91 = 116$. We CAN cover that distance in jumps of 4: it takes $116 \div 4 = 29$ jumps. That means we made 29 new terms after the first one, so 207 is the 30th term overall.

(c) PARTIAL solution: The total distance between 18 and 1923 can't be covered in jumps of 17...

(d) Solution: The total distance is $42,636$ from 18 to $42,654$ $(42654 - 18 = 42636)$, which can be perfectly split into 17s $(42636 \div 17 = 2508)$. This computation tells us how many extra terms we needed to add onto the first one - 2508 extra terms - and $18 + 17(2508) = 42654$, so yes, it's in the list. It's the 2509th term.

(e) ANSWER (not full solution): Yes, it shows up. Total distance is 140-(-625)=765...

(f) ANSWER (not full solution): No. The total distance doesn't split exactly into 6s...