Think It Through
September 29

1. Evaluate each of the following sums.
   (a) $1 + 2 + 3 + \cdots + 100$

   (b) $5 + 8 + 11 + \cdots + 545$

2. What is n in the following expression?

$$1 + 2 + 3 + \cdots + (n-1) + n + (n-1) + \cdots + 3 + 2 + 1 = 289$$

3. In an arithmetic sequence of 200 terms the 27^{th} term equals 2, sand the 174^{th} term equals 4. Find the sum of all the terms in the sequence.

4. An arithmetic sequence has 11 terms which sum to 220. What is the middle term in the sequence?

5. Real numbers $a_1, a_2, \ldots, a_{99}$ form an arithmetic sequence. Suppose

$$a_2 + a_5 + a_8 + \cdots + a_{98} = 205$$

Find the value of $\sum_{i=1}^{99} a_i$.

6. Consider an arithmetic sequence with terms $a_1, a_2, \ldots$. Determine S_{143} if $a_{11} = \frac{1}{11}$ and $a_{13} = \frac{1}{13}$.

7. Prove that for arithmetic sequence $a_1, a_2, \ldots, a_n$, that the sum of the terms S_n, is

$$S_n = \frac{n}{2}\left(2a_1 + (n-1)d\right)$$