Think It Through
September 29

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

   Solution: 5050

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

   Solution: 49775

   Solution: 17

2. What is n in the following expression?

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

   Solution: 17

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.

   Solution: 600

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

   Solution: 20

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 $\sum_{i=1}^{99} a_i$.

Solution: 615

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

Solution: 72

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

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