1. Show that the sum of an A.P. whose first term is a, the second term is b and last term is a_n, is equal to $\dfrac{(a+c)(b+c-2a)}{2(b-c)}$.

2. Find the common difference of an A.P. whose first term is 100 and the sum of whose first six terms is five times the sum of the next six terms. (Hint: $S_6 = 5(S_{12} - S_6)$).

3. The sum of first n terms of an A.P. is given by $n^2 + 8n$. Find the 12th term of the A.P. Also find the nth term of the A.P.

4. Prove that $a_{p+q} + a_{p-q} = 2a_p$.

5. Which term of the A.P. 24, 21, 18, 15,… is the first negative term?

6. If the pth, qth and rth terms of an A.P. are a, b, c respectively, then show that $a(q - r) + b(r - p) + c(p - q) = 0$.

7. Show that $(a - b)^2, (a^2 + b^2)$ and $(a + b)^2$ are in A.P.

8. If pth, qth and rth terms of an A.P. are a, b, c respectively, then show that $(a - b)r + (b - c)p + (c - a)q = 0$.

9. Solve the equation $1 + 4 + 7 + 10 + 13 + 16 +…+x = 287$.

10. If the sum of first five terms of an A.P. is equal to the sum of the first ten terms of the A.P., show that the sum of its 15 terms is zero.

11. If the sum of the first n terms of an A.P. is given by $S_n = 3n^2 - n$, find its:

(i) n^{th} term

(ii)   first term

(iii)   common difference

12. Find three numbers in A.P., whose sum is 21 and whose product is 315.

13. Find four numbers in an A.P., whose sum is 50 and in which the greatest number is four times the least.

14. The sum of three consecutive terms of an A.P. is 15 and the sum of their squares is 83. Find the terms.

15. The sum of five numbers in an A.P. is 25 and the sum of their squares is 165. Find the numbers.

16. The sides of a right angled triangle are in A.P. Show that they are in the ratio 3 : 4 : 5.

17. Divide 32 into four parts which are in A.P. such that the product of extremes is to the product of means is 7 : 15.