

# Arithmetic Progression Worksheet

1. If  $(m + 1)^{\text{th}}$  term of an A. P. is twice the  $(n + 1)^{\text{th}}$  term. Prove that the  $(3m + 1)^{\text{th}}$  term is twice the  $(m + n + 1)^{\text{th}}$  term.
2. In an AP, if  $S_n = 3n^2 + 5n$  and  $a_k = 164$ , find the value of  $k$ .
3. The sum of the first  $n$  terms of an A.P whose first term is 8 and the common difference is 20 is equal to the sum of first  $2n$  terms of another AP whose first term is - 30 and the common difference is 8. Find  $n$ .
4. The sum of four consecutive numbers in an AP is 32 and the ratio of the product of the first and the last terms to the product of the two middle terms is 7 : 15. Find the numbers.
5. Find the sum of all three digit numbers which leave the remainder 3 when divided by 5
6. The houses of a row are numbered consecutively from 1 to 49. Show that there is a value of  $x$  such that the sum of the numbers of the houses preceding the house numbered  $x$  is equal to the sum of the numbers of the houses following it. Find this value of  $x$ . [Hint :  $S_{x-1} = S_{49} - S_x$  ]
7. If  $S_n$  denotes the sum of first  $n$  terms of an AP, prove that  $S_{12} = 3(S_8 - S_4)$
8. The sum of the third and the seventh terms of an AP is 6 and their product is 8. Find the sum of the first sixteen terms of the AP.
9. If the  $a^{\text{th}}$  term of an A. P. be  $1/b$  and  $b^{\text{th}}$  term be  $1/a$  then show that its  $(ab)^{\text{th}}$  term is 1.
10. If  $m$  times the  $m^{\text{th}}$  term of an A. P. is equal to  $n$  times its  $n^{\text{th}}$  term. Show that the  $(m + n)^{\text{th}}$  term of the A. P. is zero.