

[07-09-11-NAM-12]

- For each of the following APs, find the common difference,  $d$ .
  - 11, 13, 15, . . .
  - 9, 4, -1, . . .
  - $x, 2x, 3x, \dots$
  - $\frac{x+y}{2}, \frac{x-y}{2}, \frac{x-3y}{2}, \dots$
- For the following APs, find the indicated terms.
  - 4, 11, 18, . . . ;  $T_5$  and  $T_{11}$
  - 3, -3, -9, . . . ;  $T_7$  and  $T_{20}$
  - $\frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \dots$  ;  $T_5$  and  $T_9$
  - 2, 1.5, 1, . . . ;  $T_6$  and  $T_{15}$
- Find an expression for the  $n^{\text{th}}$  term in each of the following APs.
  - 2, 6, 10, . . .
  - 13, 9, 5, . . .
  - $\frac{1}{6}, \frac{2}{3}, \frac{7}{6}, \dots$
  - 2.1, 3.5, 4.9, . . .
- In an AP, the third term is 4.4 and the tenth term is 10. Find the sixth term.
- The fifth and eighth terms of an AP are  $p$  and  $q$  respectively. Show that the 20<sup>th</sup> term is  $5q - 4p$ .
- Find the arithmetic mean of the following:
  - 3, 21
  - 2, 14
  - $\frac{1}{4}, \frac{5}{6}$
  - $\frac{x+y}{2}, \frac{3x-5y}{2}$
- $x^2, 5x$  and  $7x - 4$  are three successive terms of an AP. Find the possible values of  $x$ . If these terms are all positive and  $x^2$  is the second term, find the first term and the thirteenth term of this AP.
- For each of these APs, find the indicated sums.
  - 9, 13, 17, . . . ;  $S_6$  and  $S_{13}$
  - 9.2, 5.8, 2.4, . . . ;  $S_5$  and  $S_{20}$
- Find the indicated sums of the AP whose  $n^{\text{th}}$  term is given by
  - $T_n = 3n + 9$ ;  $S_5$  and  $S_{12}$ ,
  - $T_n = 5 - 4n$ ;  $S_8$  and  $S_{21}$ .
- Find the sum of the AP
  - 5, 8, 11, . . . to 20 terms;
  - 81, 75, 69, . . . , -9.
- An AP has first term 7 and common difference 4. If the sum of all its terms is 900, how many terms are there?
- An AP has 20 terms. Its first term is 10 and the sum of all its terms is 580. Calculate the value of the last term and of the common difference.
- The ninth term of an AP is 28 and the sum of its first 15 terms is 330. Find the sum of the first 10 terms.
- In an AP, the sum of the first 6 terms is 75 and the sum of the next 4 terms is 110. Find the eleventh term.
- In an AP consisting of 15 terms, the sum of the last five terms is 305. If the sixth term is 26, find the sum of this AP.

16. In an AP consisting of 30 terms, the sum of the last ten terms is twice the sum of the first ten terms. If the common difference is 2, find the first term.
17. Find the sum of all integers between 100 and 300 which are multiples of 7.
18. Find the sum of all integers between 200 and 400 which are divisible by 3 but not by 5.
19. Find (a)  $(m + 1) + (m + 2) + \dots + 2m$  in terms of  $m$ ,  
(b)  $3 + (5 - k) + (7 - 2k) + \dots$  to 15 terms in terms of  $k$ .
20. Find the smallest integer value of  $n$  such that  $1 + 2 + 3 + 4 + \dots + n > 600$ .
21. The sum of the first  $n$  terms of an AP is  $6n - 3n^2$ . Find  
(a) the first term, (b) the sixth term, (c) the  $n^{\text{th}}$  term.
22. The ninth term of an AP is twice its third term and the sum of the first ten terms is 170. Find the sum of the last ten terms given that the whole progression has 30 terms.
23. In the AP 3, 7, 11,  $\dots$ , find the value of  $n$  for which the sum of the first  $2n$  terms will exceed the sum of the first  $n$  terms by 155.
24. Find the sum of all integers between 50 and 400 which end in 3.
25. A piece of string of length 12 m is cut into  $n$  pieces in such a way that the lengths of the pieces are in AP. If the lengths of the longest and shortest pieces are 1 m and 20 cm respectively, find  $n$  and the total length of the twelve shortest pieces.
26. Find the sum of the first  $n$  terms of the AP whose  $r^{\text{th}}$  term is  $8r + 5$ . How many terms must be taken for the sum to be just under 1 000?
- \*27. In the AP 1, 2, 3, 4, 5, 6,  $\dots$ , every third term is multiplied by 3 so that the progression becomes 1, 2, 9, 4, 5, 18,  $\dots$ . Find the sum of the first 60 terms of the new progression.
- \*28. The sum of the squares of 3 consecutive terms of a diminishing AP is  $\frac{33}{8}$  times the square of the middle term, and the product of the 3 terms is 28. Find the 3 terms.  
(Hint: Let the 3 terms be  $a - d$ ,  $a$  and  $a + d$ .)

**Exercise 13.2** (p. 252)

1. (a) 2 (b) -5 (c)  $x$  (d)  $-y$   
2. (a) 32, 74 (b) -33, -111 (c)  $1, 1\frac{2}{3}$  (d) -0.5, -5  
3. (a)  $4n - 2$  (b)  $17 - 4n$  (c)  $\frac{1}{2}n - \frac{1}{3}$  (d)  $0.7 + 1.4n$   
4. 6.8 6. (a) 12 (b) 6 (c)  $\frac{13}{24}$  (d)  $x - y$   
7. -1, 4; 12, 60 8. (a) 114, 429 (b) 12, -462  
9. (a) 90, 342 (b) -104, -819 10. (a) 670 (b) 576  
11. 20 12. 48, 2 13. 70 14. 35 15. 540 16. 31  
17. 5 586 18. 16 200 19. (a)  $\frac{m}{2}(3m + 1)$  (b)  $255 - 105k$   
20. 35 21. (a) 3 (b) -27 (c)  $9 - 6n$   
22. 570 23. 5 24. 7 805 25. 20,  $5\frac{17}{95}$  m  
26.  $4n^2 + 9n$ ; 14 27. 3 090 28. 7, 4, 1