Arithmetic Progression

1 Mark

1. The common difference of -2, -4, -6, -8, ... is?
2. Find next term of the sequence 10, 8, 6 ...
3. Find the 6th term of the A.P. 3, 5, 7 ....
4. Find the nth term of the A.P. 2, 4, 6, 8....
5. If the nth term of A.P. is $4n + 5$, then find the common difference.
6. Determine m so that $2m + 1$, $m + 1$, $-m + 3$ are in A.P.
7. In the series 20, 18, 16, ..., which term is -2.
8. Find the 8th term of the series Whose $T_{n-1} = 3n + 1$.
9. If the nth term of the series A.P. is $3n - 1$, then series is?
10. Which term of the A.P. 5, 13, 21 is 181.
11. Find the sum of 20 terms of an A.P. Whose n^{th} term is $4n - 1$.
12. If sum of the n terms of A.P. is 476, last term is 20, n = 17 then first term is?
13. The sum of n terms is given by $n^2 + n$, then $T_n = ?$
14. If $T_n = 2n$ of an A.P. then find common difference.
15. If the sum of n terms of A.P. 476, l= 20, a = 36, then n = ?
16. If the sum of three numbers in A.P. 15, then a = ?
17. Find the 50th term of A.P. 2, 5, 8, 11,.....
18. If the 3rd term of an A.P. is -40 and 13th term is 0, then d = ?
19. Find the sum of n natural numbers.
20. If the sum of n terms $n^2 - n$, find the nth term.
21. Find the sum of 30 terms of an A.P. Whose n^{th} term is $3n - 1$.
22. If the sum of n terms is 476, last term 20 and common difference -1, then find n.
23. If l = 20, d = -1, n = 17, then find first term of A.P.
24. Find Sum of the number $1 + 2 + 3 + ...+ 100$.
25. Find the 17th term of the series $3 + 7 +11 + 15 + ...$
26. If the sum of n terms of A.P. is 504, l = 20, a = 36, then n = ?
27. The nth term of the A.P. $2n - 5$, then find the series.
28. The sum of 15 terms of the series 1, 3, 5.... is?
29. The sum of first 20 natural number is?
30. If a = 3, d = 2, l = 23, then S_n is?
31. If a = 3, n = 20 and $S_n = 300$, then l is?
32. Find the sum of first 15 terms of an A.P. if $T_2 = 1$ and $T_5 = 22$.
33. The sum of three numbers in A.P. is 27 and their product is 504, then the numbers are?
34. Find the four numbers in A.P. Whose sum is 16 and sum of their squares is 84.
35. Arithmetic mean between 5 and -15 is
36. The A.M. of $(a + b)^2$ and $(a - b)^2$ is
37. $\dfrac{c^{n+1} + d^{n+1}}{c^n + d^n}$ is the A.M. of c and d, then n is.

38. If the 2nd , 21st and the last term of an A.P. are $\dfrac{5}{2}$, -7, $\dfrac{-23}{2}$ respectively, then find the number of terms.

39. The sum of 3 A.M. 2 and 10 is

40. The ratio of the n terms of two A.P. are in the ratio (4n + 1) : (3n – 3), then the ratios of their 6th terms.

41. Sita saves Rs.32 during the first year, Rs.36 in the next year and Rs.40 in the third year. If she continues her saving in this sequence in how many years will she save Rs.2000?

42. Which term of the A.P. 20, 17, 14, …. is the first negative term?

2/3/4 Marks

1. The seventh term of A.P. is 34 and 15th term is 74. Determine the first and the 40th term.

2. The fourth term of A.P. is equal to 3 times the first term and the seventh term exceeds twice the third term by 1. Find the first term and the common difference.

3. Which term of the A.P.: 3, 15, 27, 39, ….. is 132 more than its 54th term?

4. If the 7 times the seventh term of an A.P. is equal to 11 times its 11th term, show that 18th term of A.P. is zero.

5. Prove that a, b, c are in A.P. iff $\dfrac{1}{bc}, \dfrac{1}{ca}, \dfrac{1}{ab}$ are in A.P.

6. Determine the A.P. whose 3rd term is 16 and the difference of 5th term from the 7th term is 12.

7. Determine the A.P. whose 3rd term is 5 and 7th term is 9.

8. Which term of A.P.: 3, 10, 17, … will be 84 more than its 13th term?

9. Determine k so that $k + 2, 4k - 6, 3k - 2$ are the three consecutive terms of an A.P.

10. Find the sum of all three digit numbers which leave the remainder 2 when divided by 5.

11. The third term of an A.P. is 7 and seventh term exceeds three times the third term by 2. Find the first term, the common difference and the sum of the first 20 terms.

12. In an A.P. the sum of three numbers is – 3 and their product is 8. Find the numbers.

13. Find four terms in an A.P. whose sum is 20 and the sum of whose square is 120.

14. The third term of an A.P. is p and the fourth term is q. Show that n^{th} term of an A.P. is $t_n = 4p - 3q + (q - p)n$.

15. The 6th term of an A.P. is – 10 and its 10th term is – 26. Determine the 15th term of the A.P.

16. If the 8th term of an A.P. is 31 and its 15th term is 16 more than the 11th term, find the A.P.

17. The 8th term of an A.P. is zero. Prove that its 38th term is triple its 18th term.

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

19. In a given A.P. if the pth term is q and q^{th} term is p, then show that the nth term is $(p + q - n)$.

20. If the mth term of an A.P. be $\dfrac{1}{n}$ and its nth term be $\dfrac{1}{m}$, then show that its $(mn)^{th}$ term is 1.

21. If m times the mth term of an A.P. is equal to n times the nth and $m \neq n$, show that its $(m + n)^{th}$ term is zero.

22. If p^{th}, q^{th}, r^{th} terms of an A.P. be a, b, c respectively , then show that :
$a(q - r) + b(r - p) + c(p - q) = 0$.

23. Find 10th term from the end of the A.P. 4, 9, 14, …, 254.

24. The sum of the three numbers in A.P. is 21 and their product is 231. Find the numbers.

25. Find the value of x for which $(5x+2), (4x-1)$ and $(x+2)$ are in A.P.

26. The 8th term of an A.P. 37and its 12th term is 57. Find A.P.

27. The 7th term of an A.P. is – 4 and its 13th term is -16. Find A.P.

28. If the 10th term of an A.P. is 52 and the 17th term is 20 more than the 13th term, find A.P.

29. The 4th term of an A.P. is zero. Prove that its 25th term is triple its 11th term.

30. Find the 6th term from the end of the A.P. 17, 14, 11, ….,(- 40).

31. Find the 8th term from the end of the A.P. 7, 10, 13, …., 184.

32. The sum of the three numbers in A.P. is 27 and their product is 405. Find the numbers.

33. The sum of the three numbers in A.P. is 3 and their product is – 35. Find the numbers.

34. Find the sum: $25+28+31+...+100.$

35. Find the sum of first 21 terms of the A.P. whose 2nd term is 8 and 4th term is 14.

36. If the nth term of an A.P. is $(2n+1)$, find the sum of first n terms of the A.P.

37. Find the sum of all two-digit odd positive numbers.

38. Find the sum of all natural numbers lying between 100 and 500, which are divisible by 8.

39. Find the sum of all three-digit natural numbers which are multiples of 7.

40. How many terms of the A.P. 3, 5, 7, 9, …. must be added to get the sum of 120?

41. In an A.P. the sum of first n terms is $\left(\dfrac{3n^2}{2}+\dfrac{5n}{2}\right)$. Find the 25th term.

42. If the pth term of an A.P. is $\dfrac{1}{q}$ and its qth term is $\dfrac{1}{p}$, show that sum of its first $(pq)^{th}$ term is $\dfrac{1}{2}(pq+1).$

43. If the sum of first p terms of an A.P. is the same as the sum of its first q terms (where $p \neq q$) then show that the sum of its first $(p+q)$ term is zero.

44. If the sum of first m terms of an A.P. be n and the sum of its first n terms be m then show that the sum of its first $(m+n)$ term is $-(m+n).$

45. If the sum of first n, $2n$, $3n$ terms of an A.P. be S_1, S_2, S_3 respectively, then prove that $S_3 = 3(S_2 - S_1).$

46. Which term of the A.P. 5, 9, 13, 17, … is 81? Also find the sum $(5+9+13+17+...+81).$

47. Find the sum of all natural numbers less than 100 which are divisible by 6.

48. Find the sum of all multiples of 9 lying between 300 and 700.

49. Find the sum of all three digit natural numbers which are divisible by 13.

50. Find the sum of 51 terms of the A.P. whose second term is 2 and 4th term is 8.

51. The sum of the first n terms of an A.P. is given by $S_n = (2n^2 + 5n)$. Find the nth term of A.P.

52. If the sum of 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.

53. Find the number of terms of the A.P. 63, 60, 57, … so that their sum is 693. Explain the double answer.

54. Find the number of terms of the A.P. 64, 60, 56, … so that their sum is 544. Explain the double answer.

55. The sum n terms of an A.P. is $\left(\dfrac{5n^2}{2}+\dfrac{3n}{2}\right)$. Find the 20th term.

56. Find the sum of all 3-digit natural numbers which are divisible by 13.

57. If five times the 5th term of an A.P. is equal to 8 times its 6th term, then show that its 13th term is zero.

58. If m^{th} term of an A.P. be $\dfrac{1}{n}$ and n^{th} term be $\dfrac{1}{m}$, then show that its $(mn)^{th}$ term be 1.

59. If the pth term of an A.P. is q and the qth term is p, prove that its nth term is $(p+q-n)$.

60. If m times the mth term of an A.P. is equal to n times its nth term, show that the $(m+n)^{th}$ of the A.P. is zero.

61. If $(m+1)^{th}$ term of an A.P. is twice the $(n+1)^{th}$ term, prove that its $(3m+1)^{th}$ term is twice the $(m+n+1)^{th}$ term.

62. If the numbers a, b, c, d, e form an A.P. then find the value of $a-4b+6c-4d+e$.

63. The sum of n terms of three arithmetical progression are S_1, S_2 and S_3. The first term of each is unity and the common differences are 1, 2, 3 respectively. Prove that $S_1+S_3=2S_2$.

64. If the sum of m terms of an A.P. is the same as the sum of its n terms, show that the sum of its $(m+n)$ terms is zero.

65. The sum of the first p, q, r terms of an A.P. are a, b, c respectively. Show that $\dfrac{a}{p}(q-r)+\dfrac{b}{q}(r-p)+\dfrac{c}{r}(p-q)=0$.

Answers
1 Mark

1.   -2
2.   4
3.   13
4. $2n$
5.   4
6.   2
7.   12th
8.   28
9.   2, 5, 8, ...
10. 23rd
11. 320
12. 36
13. $2n$
14. 2
15. 17
16. 5
17. 149
18. 4
19. $\frac{n}{2}(n+1)$
20. $2n-2$
21. 1365
22. 17
23. 36
24. 5050
25. 67
26. 18
27. -3, -1, 1,...
28. 225
29. 210
30. 143
31. 27
32. 645
33. 4, 9, 14
34. 1, 3, 5, 7
35. -5
36. a^2+b^2
37. 0
38. 30
39. 18
40. 5:3
41. 25
42. 8th

2/3/4 Marks

1. 4, 199
2. 3, 2
3. 65th
6. 4, 10, 16, 22…
7. 3, 4, 5, 6…
8. 25th term
9. 3
10. 98910
11. -1, 4, 740
12. -4, -1, 2 or 2, -1, -4
13. 2, 4, 6, 8 or 8, 6, 4, 2
15. -46
16. 3, 7, 11, 15, 19…
18. 10
23. 209
24. 3, 7, 11 or 11, 7, 3
25. 3
26. 2, 7, 12, ...
27. 8, 6, 4, 2, ...
28. 7, 12, 17,...
30. -25

31. 163
32. 3, 9, 15
33. -5, 1, 7
34. 1625
35. 735
36. $n^2 + 2n$
37. 2475
38. 1500
39. 70336
40. 10
41. 76
47. 816
48. 21978
49. 37674
50. 3774
51. $4n + 3$
52. $6n - 4$, 2, 6
53. 21 or 22
54. 16 or 17
55. 99
56. 37674
62. 0

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