ARITHEMATIC PROGRESSION

1. The 8th term of an A.P., whose first two terms are – 5 and 2 respectively, is :

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

3. The 26th, 11th and the last term of an A.P. are 0, 3 and – 1/5 respectively. Find the common difference and the number of terms of the A.P.

4. The marathon is a long-distance foot race with a distance of 42.195 km, usually run as a road race, but the distance can be covered on trail routes. The marathon can be completed by running or with a run/walk strategy. The marathon was one of the original modern Olympic events in 1896.

Neha, a student of class X, wishes to participate in a marathon. She decided to begin her practice by gradually increasing her running distance. In the first week, she decided to run 3 km each day and increase the distance by 2 km each week, i.e., in the second week she would run 5 km each day, in the third week she would run 7 km each day and so on.

Based on the above information, answer the following questions :

(i) What distance will Neha cover each day of the 8th week of her practice ?

(ii) In which week would she be able to run for 45 km each day ?

(iii) (a) What is the total distance covered by Neha after 11 weeks, if she practised for 5 days in each week ?

OR

(b) Had she increased the distance by 3 km each week instead of 2 km each week, in how many weeks would she have trained herself to run for 42 km per day ?

5. The 30th term of the AP 10, 7, 4, ... is :

6. Find the sum of all integers between 50 and 500 which are divisible by 7.

7. How many terms of the A.P. 27, 24, 21, must be taken so that their sum is 105 ? Which term of the A.P. is zero?

8. How many terms of the AP 27, 24, 21 .....should be taken so that their sum is zero.

9. In an AP ,if a = 8 and 10^{th} term is -19 then find d?

10. In an A.P. if $Sn=4n^2 -n$, then

I. Find the first term and common difference.

II. Write the A.P.

III. Which term of the A.P. is 107 ?

11. In an A.P., if d = –4 and a7 = 4, then the first term 'a' is equal to

12. Saving money is a good habit and it should be inculcated in children right from the beginning. Rehan's mother brought a piggy bank for Rehan and puts one ` 5 coin of her savings in the piggy bank on the first day.She increases his savings by one` 5 coin daily.

Based on the above information, answer the following questions :

(i) Howmany coins were added to the piggy bank on 8th day?

(ii) Howmuch money will be there in the piggy bank after 8 days?

(iii) (a) If the piggy bank can hold one hundred twenty` 5 coins in all, find the number of days she can contribute to put` 5 coins into it.

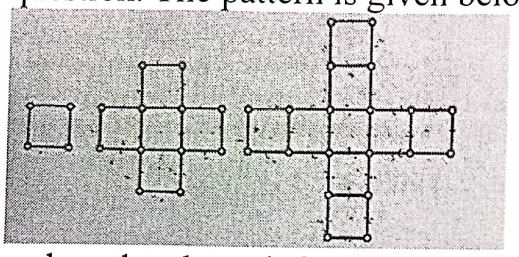
OR

(errors · eraser)

(iii) (b) Find the total money saved, when the piggy bank is full.

13. If the first term of an AP is –3 and common difference –2, then the seventh term is

14. While preparing for a competitive examination, Akbar came across a match-stick pattern based question. The pattern is given below



Based on the above information, answer the following questions :

(i) Write first term and common difference of the A.P. formed by number of squares in each figure.

(errors · eraser)

(ii) Write first term and common difference of the A.P. formed by number of sticks used in each figure.

(iii) (a) How many squares are there in Fig. (10) ? Also, write the number of sticks used in Fig. (10)

OR

(iii) (b) If 88 sticks are used to make mth figure (Fig. (m)), find the value of m. How many squares are formed in this figure ?

15. The 30th term of the A.P.–3,–7,–11,.....is :

16. If in an A.P., a = 2 and S10 = 335, then its 10th term is:

17. A manufacturer of TV sets produced 720 TV sets in the fourth year and 880 TV sets in the eighth year. Assuming that the production increases uniformly by a fixed number every year, find the production in the tenth year and the total production in the first seven years.

(errors · eraser)

18. The common difference of an A.P., if a23 – a19 = 32, is :

19. The second term of an A.P. is 29 and the fourth term is 51. If the last term of the A.P. is 425, find how many terms are there and what is their sum.

(errors · eraser)

20. If the sum of the first 7 terms of an A.P. is 91 and that of the first 17 terms is 561, then find the sum of the first n terms and hence find the nth term.

21. Sumant's mother started a new shoe shop. To display the shoes, she put 3 pairs of shoes in the 1st row, 5 pairs in the 2nd row, 7 pairs in the 3rd row and so on.

Based on the above information, answer the following questions :

(i) How many pairs of shoes are displayed in the 6th row ?

(ii) What is the difference of pairs of shoes in the 1st row and the 6th row ?

(iii) (a) Find the total number of pairs of shoes displayed in the first 15 rows.

OR

(b) If the pairs of shoes displayed in the 4th row are 'on sale' at price of 500 for each pair, then find the total amount (money) earned by Sumant's mother if all shoes displayed in the 4th row are sold out.

22. If common difference of an A.P. is -6, then value of a20 - a14 is:

23. A fashion designer is designing a fabric pattern. In each row, there are some shaded squares and unshaded triangles.

Based on the above, answer the following questions :

(i) Identify A.P. for the number of squares in each row.

(ii) Identify A.P. for the number of triangles in each row.

(iii) (a) If each shaded square is of side 2 cm, then find the shaded area when 15 rows have been designed.

(b) write a formula for finding total numbers of triangls in 'n' numbers of row. Hence find s10.

24. Which term of an AP 21, 42, 63, 84, ... is 210 ?

25. Nikhil started saving money for his new project. He started saving 240 in the first month, 300 in the second month 360 in the third month and so on. He continues to save in this manner for quite some time.

Based on the above, answer the following questions :

(i) Are the numbers representing his savings in AP ? If so, write the first term (a) and the common difference (d).

(ii) In which month will he save 660 ?

(iii) (a) What amount will he save in the 15th month ?or (b) How much money he will accumulate after 10 months.

26. Aahana being a plant lover decides to convert her balcony into beautiful garden full of plants. She bought few plants with pots for her balcony. She placed the pots in such a way that number of pots in the first row is 2 , second row is 5 , third row is 8 and so on.

Based on the above information, answer the following questions :

(i) Find the number of pots placed in the 10th row

(ii) Find the difference in the number of pots placed in 5th row and 2nd row.

(iii) If Aahana wants to place 100 pots in total, then find the total number of rows formed in the arrangement.

OR

If aahana has sufficient space for 12 rows then how many pots she coud be arrange?

27. How many terms are there in the A.P. given below ?

14, 19, 24, 29, ..., 119

28. If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms

29. if the sum of the first 7 terms of an A.P. is -4 and that of 11 terms is -55 then find the sum of its first 'n' terms.

30. In an A.P., the sum of the first n terms is $3n^2 + n$. Find the first term and the common difference of the A.P. Hence, Find its 15th term.

31. A man repays a loan of 3,250 by paying 20 in the first month and then increases the payment by 15 every month. How long will it take to clear the loan ?

32. The sum of the first 21 terms of an A.P. : 16, 12, 8, 4, ... is

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

34. Find the sum of first 25 terms of the A.P. whose nth term is given by $a_n = 5 + 6n$. Also, find the ratio of 20th term to 45^{th} Term.

35. In an A.P., if $S_n = 3n^2 + 5n$ and $a_k = 164$, find the value of k.

36. Find the sum of first 51 terms of an A.P. whose second and third terms are 14 and 18, respectively.

OR

The first term of an A.P. is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.

37. The 8th term of an A.P. is 17 and its 14th term is 29. The common difference of this A.P. is

38. Find the sum of the first 15 terms of the A.P. :
1/15,1/12,1/10, ...

39. The sum of the first 100 even natural numbers is :

40. Find the sum of the first 20 terms of the A.P. :
2/3, 0, -2/3,-4/3, ...

41. The sum of the first 50 odd natural numbers is:

42. The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is

43. Find the first three terms of the AP. Also find the sum of 1^{st} 25 term.

44. The sum of first 9 terms of an AP is 171 and the sum of its first 24 terms is 996. Find the 20th term of the AP.

45. Three consecutive natural numbers are such that the sum of the square of the first and the product of the other two is 154. Find the numbers.

46. First term of ap is 5 nth term is 40 sum of first n terms is 180. find n.

47. Find the 20th term of the AP whose 7th term is 24 less than the 11th term, first term being 12.

48. The nth term of a sequence is given by: $a_n = n(n+1)(2n+1)/6$ Write the first three terms of the sequence. Does this sequence form an arithmetic progression (A.P.)? Justify your answer.

49. The nth term of a sequence is (2n-3), find its fifteenth term.

50. The nth term of a progression is 2n+3. Show that it is an A.P. Also find is 10th term.

51. If nth term of an AP is an=2n+3 then find 6th term and 20^{th} term.

52. Find the sum of the 1^{st} 15 multiples of 7.

53. Find the 12^{th} term from the last term(towards the 1^{st} term)of the AP:15,12,9,….,-57.

54. In an AP, if a = 50, d = -4 and Sn = 0, then find the value of n.

55. Find the sum of the first twelve 2-digit multiples of 7, using an AP.

56. Do you know old clothes which are thrown as waste not only fill the landfill site but also produce very harmful green house gas. So, it is very important that we reuse old clothes in whatever way we can. The picture given below on the right, shows a footmat (rug) made out of old t-shirts yarn. Observing the picture, you will notice that a number of stitches in circular rows are making a pattern : 6, 12, 18, 24, ..

Based on the above information, answer the following questions :

(a) Check whether the given pattern forms an AP. If yes, find the common difference and the next term of the AP. 2

(b) Write the nth term of the AP. Hence, find the number of stitches in the 10th circular row.

57. For an AP with common difference 6, the sum of first ten terms is same as four times the sum of first five terms. Determine the first term of the AP.

58. Find the 15th term of an AP whose first term is 17 and fourth term is 44.

59. The first term, common difference and last term of an A.P. are 12,6 and 252 respectively, Find the sum of all terms of this A.P.

60. In an AP, the first term is 12 and the common difference is 6. If the last term of the a.p is 252, find its middle term.

61. Write the next two term of the A.P $\sqrt{5},\sqrt{20},\sqrt{45},\ldots\ldots$

62. If the sum of n terms of an A.P. is given by $Sn=(3n^2+2n)$,find its nth term.

63. Which term of the AP 2, 11, 20, 29, ... will be 99 more than its 25th term ?

64. Find the sum of first 30 terms of AP : 30, 24, 18, ...

65. In an AP if $Sn = n(4n + 1)$, then find the AP

66. In an A. P. If the sum of third and seventh terms is zero.find its 5th term.

67. Determine the AP whose 3rd term is 5 and the 7th term is 9.

68. For what value of n are the nth terms of the APs : 9, 7, 5, ... and 15, 12, 9, ... the same ?

69. If the first term of an A.P. is 5, the last term is 15 and the sum of first n terms is 30, then find the value of n.

70. Let the sum of the first three terms of an A.P be 39 and the sum of its last four terms be 178. Ifthe first term of this A.P. is 10, then the medianof the A.P. is

71. The sum of the first three terms of an AP is 33. If the product of the first and the third term exceeds the second term by 29, find the AP.

72. Find the sum of the first 20 terms of an AP whose nth term is given as an = 5-3n

73. While buying an expensive item like a house or a car, it becomes easier for a middle-class person to take a loan from a bank and then repay the loan along with interest in easy instalments. Aman buys a car by taking a loan of 2,36,000 from the bank and starts repaying the loan in monthly instalments. He pays 2,000 as the first instalment and then increases the instalment by 500 every month.

(a) Find the amount he pays in the 25th instalment.

(b) Find the total amount paid by him in first 25 instalments.

74. If p-1,p+1,2p+1 arein a.p then the valueof p is