INDIAN SCHOOL NIZWA - WORKSHEET

MATHEMATICS

5. Arithmetic Progressions

Nam_____ Date:29-5-25 Class: X Sec: ___

1. If n^{th} term of an A.P. is $5n-6$, then its common difference is :
(a) -6 (b) $5n$ (c) 5 (d) 6

2. The 20^{th} term of the A.P. : $10\sqrt{2}, 6\sqrt{2}, 2\sqrt{2}, \ldots$ is :
(a) $-76+10\sqrt{2}$ (b) $-62\sqrt{2}$ (c) $-66\sqrt{2}$ (d) $86\sqrt{2}$

3. 10^{th} term of the A.P. : $-12, -19, -26, \ldots$ is
(A) -75 (B) -65
(C) 51 (D) -82

4. 22^{nd} term of the A.P. : $\frac{3}{2}, \frac{1}{2}, \frac{-1}{2}, \frac{-3}{2}, \ldots\ldots$ is
(A) 45/2 (B) -9 (C) -39/2 (D) -21

5. If the sum of first n terms of an A.P. is given by $S_n = \frac{n}{2}(3n+1)$, then the first term of the A.P. is
(A) 2 (B) 3/2 (C) 4 (D) 5/2

6. Find the sum of the first 10 natural numbers.

7. Let a_n be an arithmetic progression , for which $a_1 + a_2 + a_3 = 102$ and $a_1 = 15, find\ a_{10}$.

8. For what value of k : 2k, k+10 and 3k+2 are in A.P?

9. In an AP , if a=1, $a_n = 20, and\ S_n = 399$, then find n?

10. Find the 9^{th} term from the end of the AP 5,9,13,……,185.

11. How many terms of the AP 18, 16, 14, ……be taken so that their sum is zero.

12. Find the sum of the A.P. $7, 10\frac{1}{2}, 14, \ldots 84$.

13. If the sum of first n terms of an A.P. is given by $S_n = \frac{n}{2}(2n+8)$.
Then, find its first term and common difference. Hence, find its 15^{th} term.

14. Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5.

15. Find the 31^{st} term of an AP whose 11^{th} term is 38 and the 16^{th} term is 73.

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

17. If S_n denotes the sum of the first n terms of an AP, prove that $\boldsymbol{S_{30} = 3(S_{20} - S_{10})}$.

18. If the sum of the first m terms of an AP is $2m^2 + 3m$, then what is its second term?

19. Reshma wanted to save at least ₹6,500 for sending her daughter to school next year (after 12 months). She saved ₹450 in the first month and raised her savings by ₹20 every next month. How much will she be able to save in the next 12 months? Will she be able to send her daughter to the school next year?

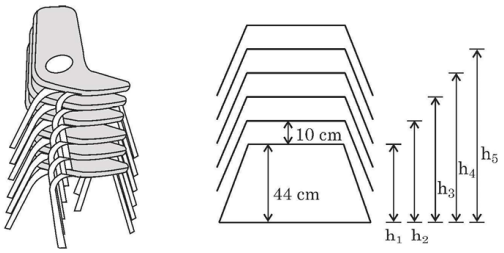
20. If the sum of the first n terms of an A.P be $\boldsymbol{3n^2 + n}$ and its common difference is 6, find its first term.

21. If the sum of first 6 terms of an A.P is 36 and that of the first 16 terms is 256, find the sum of first 10 terms.

22. Find the middle term of the AP -6, -2, 2, ……., 58.

23. How many three digit numbers are such that when divided by 7, leave a remainder 3 in each case.

24. **A tent house owner provides furniture on rent. He stacks chairs in his shop to save space.**



In the diagram, the height of seat of chair from ground is represented by h_1, h_2, h_3, ... The height of first seat is 44 cm from ground level and gap between every two seats is 10 cm.

(i) **Write the values of h_1, h_2, h_3, h_4 and h_5 in this order only.** **1**

(ii) **Show that the above values form an A.P. Write its first term and common difference.** **1**

(iii) (a) **If chairs can be stacked up to the maximum height of 160 cm, then find the maximum number of chairs in a stack.** **2**

OR

(iii) (b) **Is it possible to stack 15 chairs if maximum height of the stack can not be more than 180 cm ? Justify your answer.**

25. In a society, a yoga instructor was hired to train the people of the society to live a healthy lifestyle. Yoga sessions were held daily from 5 p.m. to 7 p.m. in the society park. On day one, 5 people joined the yoga session, on day two, 3 more people joined, on day three, another 3 people joined and in this manner every next day, 3 more people kept on joining.

Based on the given information, answer the following questions :

(i) On which day did 59 people join the yoga session ? *1*

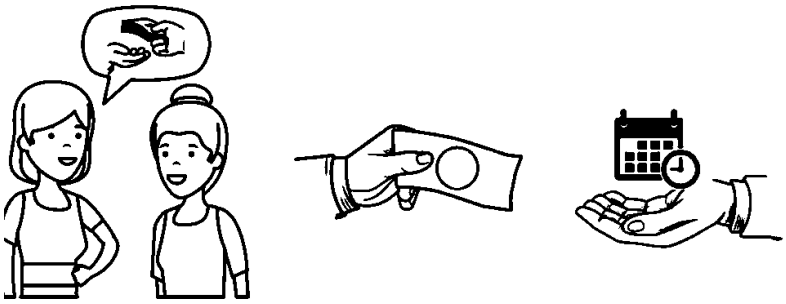
(ii) How many people joined the yoga session on the 31st day ? *1*

(iii) (a) The yoga instructor was paid ₹ 100 for each person attending the yoga session. On which day would he earn ₹ 5,000 ? *2*

OR

(b) What was the total amount earned by the yoga instructor in 16 days ? *2*

26. A woman borrowed ₹ 10,00,000 from her friend and promised to return the borrowed money in monthly instalments beginning from the next month. After one month, she returned ₹ 10,000, the next month she returned ₹ 15,000, the third month she returned ₹ 20,000 and so on, thereby increasing the monthly instalment uniformly.



Based on the above information, answer the following questions :

(i) Find the amount of instalment paid in the tenth month. *1*

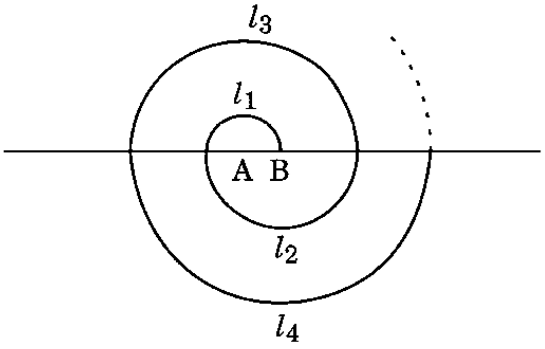
(ii) In which instalment did she pay ₹ 40,000 ? *1*

(iii) (a) If she returned ₹ 11,50,000 in all, how many instalments did she pay ? *2*

OR

(b) By which instalment has she returned a total amount of ₹ 3,25,000 ? *2*

27. In a garden, saplings of rose flowers were planted at equal intervals to form a spiral pattern. The spiral is made up of successive semicircles, with centres alternatively at A and B, starting with centre at A, of radii 50 cm, 100 cm, 150 cm, ... as shown in the figure given below. Spiral 1 has 10 flowers, Spiral 2 has 20 flowers, Spiral 3 has 30 flowers and so on.



Based on the above information, answer the following questions :

(i) What is the radius of the 13^{th} spiral ? *1*

(ii) If the radius of the n^{th} spiral is 500 cm, find the value of n. *1*

(iii) (a) Find the total number of saplings till the 11^{th} spiral. *2*

OR

(b) Till which spiral, will there be a total of 450 saplings ? *2*

28. **CASE STUDY**

Ram wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of ₹ 1,18,000 by paying every month starting with the first instalment of ₹ 1000. If he increases the instalment by ₹100 every month, answer the following:

a) Find the amont paid in the 30^{th} instalment?
b) Find the total amont paid in 30 instalments.
c) What amount does he still have to pay after 30^{th} instalment?
d) If total installments are 40 then find the amount paid in the last instalment?