Discrete

Hemant Katta

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1. If $-\frac{5}{7}$, a, 2 are consecutive terms in an Arthimetic Progression, then the value of a is
   (a) $\frac{9}{7}$
   (b) $\frac{9}{14}$
   (c) $\frac{19}{7}$
   (d) $\frac{19}{14}$
2. If two positive integers p and q can be expressed as $p = ab^3$ and $q = a^2b$; a and b being prime numbers, then find LCM of (p, q) .
3. Show that any positive odd integer is of the form $4q+1$ or $4q+3$ for some integer q.
4. Prove that $\sqrt{5}$ is an irrational number.
5. (a) Find the sum of first 16 terms of an Arithmetic Progression whose 4^{th} and 9^{th} terms are -15 and -30 respectively.
   (b) If the sum of first 14 terms of an Arithmetic Progression is 1050 and its fourth term is 40, find its 20^{th} term.
6. (a) Find the sum of the first twelve 2-digit numbers which are multiples of 6.
   (b) In an AP, if $a_2 = 26$ and $a_{15} = -26$, then write the AP.
7. In Mathematics, relations can be expressed in various ways. The matchstick patterns are based on linear relations. Different strategies can be used to calculate the number of matchsticks used in different Fig. 1
   One such pattern is shown below. Observe the pattern and answer the following questions using Arithmetic Progression :

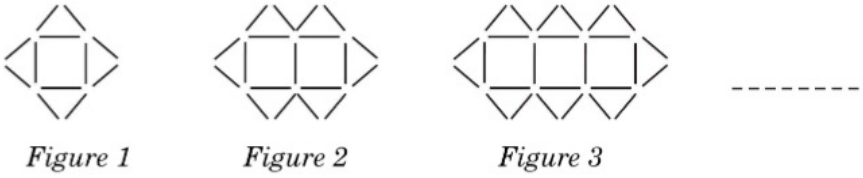

Figure 1: patterns of Figure1, figure2 ,figure3

(a) Write the AP for the number of triangles used in the Fig. 1. Also, write the nth term of this AP.

(b) Which figure has 61 matchsticks ?

8. (a) In an A.P. if the sum of third and seventh term is zero, find its 5^{th} term.

   (b) Determine the AP whose third term is 5 and seventh term is 9.

9. Find the sum of the first 20 terms of an A.P. whose n^{th} term is given as $a_n = 5-2n$

10. Find the common difference 'd' of an AP whose first term is 10 and the sum of the first 14 terms is 1505.

11. For what value of 'n', are the n^{th} terms of the APs: $9, 7, 5, \ldots$ and $15, 12, 9, \ldots$ the same?

12. (a) The curved surface area of a right circular cylinder is $176 sq.cm$ and its volume is $1232 cu.cm$. What is the height of the cylinder?

    (b) The largest sphere is carved out of a soild cube of side $21 cm$. Find the volume of the sphere.

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

14. (a) Find the number of terms in the following A.P:

$$5, 11, 17, \ldots, 203 \tag{1}$$

    (b) Find the sum of the first 20 terms of an AP whose n^{th} term is given as $a_n = 5 - 3n$

15. 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 25^{th} installment.

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