

# SETH M.R. JAIPURIA SCHOOLS BANARAS PARAO CAMPUS

## SUBJECT – MATHEMATICS

### CLASS – X (ARITHMETIC PROGRESSION)

### ARITHMETIC PROGRESSION

- How many terms of the series 54, 51, 48, ..... be taken so that, their sum is 513? Explain the double answer.
- If the ratio of the sum of the first  $n$  terms of the two AP is  $7n + 1 : 4n + 27$ , find the ratio of their  $m^{\text{th}}$  term.
- Find the sum of the following series-  
$$5 + (-41) + 9 + (-39) + 13 + (-37) + 17 + \dots + (-5) + 81 + (-3)$$
- If  $\frac{a^{n+1} + b^{n+1}}{a^n + b^n}$  is the arithmetic mean between '  $a$  ' and '  $b$  ', then, find the value of '  $n$  '.
- If  $p^{\text{th}}$  term of an A.P. is  $\frac{1}{q}$  and  $q^{\text{th}}$  term is  $\frac{1}{p}$  prove that the sum of the first '  $pq$  ' terms is  $\frac{1}{2}[pq + 1]$ .
- If  $S_n$  denotes the sum of the first  $n$  terms of an AP Prove that  $S_{30} = 3(S_{20} - S_{10})$
- Find the sum of the integers between 100 and 200 that are-
  - divisible by 9
  - not divisible by 9
- Two APs have the same common difference. The first terms -1 and -8 respectively. Find the difference between the 4<sup>th</sup> terms.
- In a polygon the smallest interior angle is  $120^\circ$ . Angles are increased by  $5^\circ$ . Find the number of sides of the polygon.
- Show that the sum of an AP whose 1<sup>st</sup> term is  $a$ , second term is  $b$  and the last term is  $c$ , is equal to  $\frac{(a+c)(b+c-2a)}{2(b-a)}$
- If  $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$  are in A.P., prove that  $a^2, b^2, c^2$  are also in A.P.
- The 24<sup>th</sup> term of an AP is twice its 10<sup>th</sup> term. Show that its 72<sup>th</sup> term is 4 times its 15<sup>th</sup> term.
- 150 workers were engaged to complete a work in certain days. After first day 4 workers left the jobs, after 2<sup>nd</sup> day 4 more workers left the job and so on. The assigned work took 8 more days to be finished. In how many days the work was completed.
- A small terrace at a football ground comprises of 15 steps each of which is 50 m long and built of solid concrete. Each step has a rise of  $\frac{1}{4}$  m and a tread of  $\frac{1}{2}$  m. Calculate the total volume of concrete required to build the terrace.
- The houses of a row are numbered consecutively from 1 to 49. Show that there is the value of  $x$  such that the sum of the numbers of the houses preceding the house numbered  $x$  is equal to the sum of the numbers of the houses following it. Find the value of  $x$ .
- The sum of  $n, 2n, 3n$  terms of an AP is  $S_1, S_2$  and  $S_3$  respectively. Prove that  $S_3 = 3(S_2 - S_1)$
- A ladder has rungs 25 cm apart. The rungs decrease uniformly in length from 45 cm at the bottom to 25 cm at the top and the bottom rungs are  $2\frac{1}{2}$  m apart, what is the length of the wood required for the rungs?
- Solve the equation:  $1 + 4 + 7 + 10 + \dots + x = 287$
- Find three numbers in A.P. whose sum is 21 and their product is 231.

19. The sum of the first  $p$ ,  $q$  and  $r$  terms of an AP is  $a$ ,  $b$ , and  $c$  respectively.

20. Prove that  $\frac{a}{p}(q - r) + \frac{b}{q}(r - p) + \frac{c}{r}(p - q) = 0$