

CLASS X

SUBJECT: MATHEMATICS

TOPIC	ARITHMETIC PROGRESSION
PREREQUISITE KNOWLEDGE	• Laws of indices • Simultaneous equations with two unknowns. • Quadratic Equations.
OBJECTIVES	The students will be able to: • demonstrate understanding of arithmetic progression formula in work and discussion • describe the concept of a sequence (progression) • define an A.P. and cite examples • explain what the formula for an arithmetic progression is • find common difference and general term of a A.P • find the fourth quantity of an A.P. given any three of the quantities a, d, n and t_n • give reasons why the arithmetic formula makes sequencing easier. • calculate the common difference or any other term of the A.P. given any two terms of the A.P • derive the formula for the sum of 'n' terms of an A.P • calculate the fourth quantity of an A.P. given three of S, n, a and d • solve problems of daily life using concept of an A.P
SUMMARY OF THE CHAPTER	In this chapter, students will study one of these patterns in which succeeding terms are obtained by adding a fixed number to the preceding terms. They shall also see how to find their nth terms and the sum of n consecutive terms, and use this knowledge in solving some daily life problems. Sequence: A set of numbers arranged in definite order, according to a definite rule, is called a sequence.

	Progressions: Progressions are sequences which follow a definite pattern. Arithmetic Progression: An Arithmetic progression is a sequence in which each term differs from its preceding term by a constant. General term of an AP: The general form of an AP is $a+(n-1)d$. where a is the first term , d is the common difference. Selection of terms in an AP: <table><tr><th>Number of terms</th><th>Terms</th><th>Common difference</th></tr><tr><td>3</td><td>$a-d, a, a+d$</td><td>d</td></tr><tr><td>4</td><td>$a-3d, a-d, a+d, a+3d$</td><td>$2d$</td></tr><tr><td>5</td><td>$a-2d, a-d, a, a+d, a+2d$</td><td>d</td></tr></table> Sum of n- terms of an AP : The sum of n-terms of an AP with first term, a and common difference , d is given by $S_n=\frac{n}{2} [2a + (n - 1)d]$	Number of terms	Terms	Common difference	3	$a-d, a, a+d$	d	4	$a-3d, a-d, a+d, a+3d$	$2d$	5	$a-2d, a-d, a, a+d, a+2d$	d
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TRANSACTION METHODOLOGY	Strategies used: 1) Warm up session: (a) By presenting a number series and ask the students to guess the next number in the series. (b) Then, introduce the term Arithmetic Progression or AP. 2) Real life examples : Ask the students to come up with real life examples of AP. 3) Card Activity : (a) Prepare few cards with numbers written on them. Now, divide the class in four groups. Show one card at a time to the group. Ask the												

	students from the group to check if the numbers in the series form an AP. (b) Write the first term and common difference on the card and ask the students to write the first four terms of the AP. The group that gets the maximum correct answers will be the winner. 4) Deriving the formula: Students will be divided in four groups. Each group will be asked to make presentations related to derivation of formula of n terms and sum of AP. 5) Graphical Activities: Ask the students to work on the graphical representation of AP and make a line or bar graph. Then observe the pattern of the graph and extrapolate it to estimate the next numbers in the series.
EXPECTED LEARNING OUTCOMES	Students will be able to: • identify an AP • identify the first term and the common difference of an AP • identify the sum of the first n terms of an AP and the sum of first n positive integers.
PRACTICE QUESTIONS / ASSESSMENTS	1) The 10th term of an A. P. is -15 and 31st term is -57, find the 15th term. 2) Which term of the A. P.: 5, 11, 17, ... is 119 ? 3) Is 600 a term of the A. P.: 2, 9, 16, ...? 4) The common difference of an A. P. is 3 and the 15th term is 37. Find the first term. 5) Find the sum of the following A. P's. up to 15 terms (a) 8, 3, -2, -7, -12, (b) 8, 11, 14, 17, 6) How many terms of the A. P.: 27, 23, 19, 15, ... have a sum 95? 7) A man takes an interest-free loan of Rs. 1740 from his friend agreeing to repay in monthly installments. He gives Rs. 200 in the first month

	and diminishes his monthly installments by Rs. 10 each month. How many months will it take to repay the loan? 8) How many terms of the progression 3, 6, 9, 12, must be taken at the least to have a sum not less than 2000 9) In a children potato race, n potatoes are placed 1 metre apart in a straight line. A competitor starts from a point in the line which is 5 metre from the nearest potato. Find an expression for the total distance run in collecting the potatoes, one at a time and bringing them back one at a time to the starting point. Calculate the value n if the total distance run is 162 metres. 10) If the sum of first n terms of a sequence be $an^2 + bn$, prove that the sequence is an A. P. and find its common difference
EVALUATION	Class test ,extra questions from refreshers, Lab manual Activity, Oral Questions