ACADEMIC PLAN :2023-24

CARMEL CONVENT SR SEC SCHOOL ,RATANPUR,BHOPAL. STD: XII

SUBJECT: MATHEMATICS

Month / No of Working Days	Name of the Unit / Chapter/Topic	Learning Outcomes	Suggested Activities/ Projects under Internal Assessment/PRACTICALS	Assignment	Assessment
APRIL	Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operations on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. Non commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries). CHAPTER 4 DETERMINANTS Determinant of a square matrix (up to 3 x 3 matrices), minors, co-factors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix. CHAPTER 12 LINEAR PROGRAMMING Introduction, related terminology such as constraints, objective function, optimization, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).	• Evolves the idea of matrices as a way of representing and simplifying mathematical concepts. • Evaluates determinants of different square matrices using their properties. • Formulates and solves problems related to maximization/ minimization of quantities in daily life situations using systems of inequalities/ inequations learnt earlier.	To minimise the cost of the food, meeting the dietary requirements.	Worksheet on Matrices and Determinants Power Point Presentation on LPP	

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JUNE	**CHAPTER 1** **RELATIONS AND FUNCTIONS** Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions. **CHAPTER 2.** **INVERSE TRIGONOMETRIC FUNCTIONS** Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions.	• identifies different types of relations and functions. • explores the values of different inverse trigonometr ic functions	To verify that the relation R in the set L of all lines in a plane, defined by R = {(l, m) : l ⊥ m} is symmetric but neither reflexive nor transitive. To verify that the relation R in the set L of all lines in a plane, defined by R = {(l, m) : l || m} is an equivalence relation.	M C Q Worksheet on Relations and Functions M C Q Worksheet on Inverse Trigonometr ic Functions	
JULY	**CHAPTER 5** **CONTINUITY AND DIFFERENTIABILITY** Continuity and differentiability, chain rule, derivative of inverse trigonometric functions, $l\ i\ k\ e$ sin−1 x , cos−1 x and tan−1 x , derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives. **CHAPTER 6** **APPLICATIONS OF DERIVATIVES** Rate of change of quantities, increasing/decreasing functions, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real Life situations)	• Demonstrat es ways to relate differentiabi lity and continuity of a function with each other	To demonstrate a function which is not one-one but is onto. To demonstrate a function which is one-one but not onto. To draw the graph of $\sin^{-1} x$, using the graph of sin x and demonstrate the concept of mirror reflection (about the line y = x). To find analytically the limit of a function f (x) at x = c and also to check the continuity of the function at that point. To understand the concepts of decreasing and increasing functions. To understand the concepts of absolute maximum and minimum values of a function in a given closed interval through its graph.	Extra Questions from NCERT Exemplar, and other refresher books M C Q Worksheet on Appliction of Derivatives	PT1 CHAPTER 3,4 and 12
AUGU ST	**CHAPTER 7** **INTEGRALS** Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them. ∫ dx x 2 ± a 2, ∫ dx √x 2 ± a 2 , ∫ dx √a 2 − x 2 , ∫ dx ax2 + bx + c , ∫	• Develops the processes in Integral calculus based on the ideas of differential calculus learnt		Extra Questions from NCERT Exemplar, and other refresher books	

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	dx √ax2 + $b\ x\ + c$ ∫ px + q ax2 + bx + c dx, ∫ px + q √ax2+bx + c dx, ∫ √a 2 ± x 2 dx, ∫ √x 2 − a 2 dx ∫√$a\ x$ 2 + $b\ x\ + c$ $d\ x$, Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.	earlier.			
SEPTEMBER	**CHAPTER 8** **APPLICATION OF INTEGRALS** Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)	• Applies the concepts of Integral calculus to calculate the areas enclosed by curves.		Extra Questions from NCERT Exemplar, and other refresher books	PT-II CHAPTER 1 TO 7 AND 12
OCTOBER	**CHAPTER 9** **DIFFERENTIAL EQUATIONS** Definition, order and degree, general and particular solutions of a differential equation. Solution of differential equations by method of separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type: dy dx + py = q, where p and q are functions of x or constants. dx dy + px = q, where p and q are functions of y or constants. **CHAPTER 10** **VECTORS** Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors. **CHAPTER 11** **THREE - DIMENSIONAL GEOMETRY** Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, skew lines, shortest distance between two lines. Angle between	• Develops the concepts of differential equations using the ideas of differentiala nd integral calculus. • Constructs the idea of vectors and their properties and relates them to earlier learnt concepts in different areas of mathematic s such as geometry, coordinate geometry etc. • Evolves newer concepts in three dimensional geometry from that learnt earlier, in the light of vector	To verify that angle in a semi-circle is a right angle, using vector method.	Extra Questions from NCERT Exemplar, and other refresher books Extra Questions from NCERT Exemplar, and other refresher books	

	two lines.	algebra, such as, direction cosines, equations of lines and planes under different conditions etc.			
NOVEMBER	**CHAPTER 13** **PROBABILITY** Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean of random variable.	• Calculates conditional probability of an event and uses it to evolve Baye's theorem and multiplication rule of probability. • Determines mean and variance of a probability distribution using the concept of random variable	To explain the computation of conditional probability of a given event A, when event B has already occurred, through an example of throwing a pair of dice.	Extra Questions from NCERT Exemplar, and other refresher books	
DECEMBER	REVISION				PREBOARD –I FULL COURSE
JANUARY	REVISION				PREBOARD –II FULL COURSE
FEBRUARY	REVISION				
MARCH					

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SIGNATURE OF THE SUBJECT COORDINATOR: