VIDYA PRATISHTHAN'S

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ANNUAL CURRICULUM PLANNING, 2024-25

Subject : Mathematics(041)

Class : XII

Expected Learn Month & Learning Objectives Sr. 21st Century **Content/** Topic Outcome No. of Days No. Skills **Relations and Functions** March-Through problems To enable the students to Students learnt abo 1 based on Relations understand the role of 14 Days Equivalence relation and functions they **Relations and Functions** bijective functions. Function Different types of will Develop: Types of relations: A relation $f : X \rightarrow Y$ is a function where every relations and functi element of set A has only one image in set B 1)Logical thinking reflexive, symmetric, Into function Many to one 2)Critical thinking transitive and equivalence A function $f : X \rightarrow Y$ is into if \exists A function $f: X \to Y$ is Many to one, 3)Imagination relations. One to one and atleast one element in Y having if 2 or more than 2 elements of X have onto and bijective the same image in Y. no preimage in X. **Types of Functions** functions. Onto One – one A function $f: X \rightarrow Y$ is Onto, if for A function $f: X \rightarrow Y$ is one – one, every element of Y I one element of X if different elements of X have **Bijective function** under f. different images in Y under f. $f(x_1) = f(x_2) \Longrightarrow x_1 = x_2$ A function $f : X \rightarrow Y$ is Bijective, if it is both One - one and Onto function. Range = Codomain **Inverse function** Let, $f: X \rightarrow Y$ be a bijection. Invertible function Then inverse function is $f^{-1}: Y \to X$, i.e, $f^{-1}(b) = a$ A function is invertible iff it is $\iff f(a) = b$ a bijection. Inverse Trigonometric Functions 2 March-09D Through approach Students will be able to Students learned al adopted for ays April-03 find solutions of problems Solutions of problem inverse trigonometr problems students of inverse trigonometric Days will attain functions. Inverse functions. Inverse 1)Imagination trigonometric functions trigonometric funct 2)Systematic ,its domain and range ,its domain and ran approach

Marks: 100



3	Matrices		April–15	Through problems	Students will be able to	Students would be
	Type	es of Matrices	Days	and Determinants,	Concept, notation, order,	Concept, notation, o
	Турс			they will develop	equality, types of matrices,	equality, types of
	4.7			1)Imagination 2)Systematic	zero and identity matrix,	matrices, zero and
	1. Row matrix	2. Column matrix 3. Rectangular		approach 3)To	symmetric and skew	of a matrix, symme
	$(1 \ 2 \ 3)$			handle real life	symmetric matrices.	and skew symmetri
	()			situation	Operations on matrices:	matrices. Operation
		$\begin{bmatrix} 3 \end{bmatrix}$ $\begin{bmatrix} 2 & 5 & 2 \end{bmatrix}$			multiplication and	multiplication and
					multiplication with a	multiplication with
					scalar. Simple properties	scalar. Simple prop
	4. Square matrix	5. zero matrix 6. Diagonal matrix			and scalar multiplication.	and scalar multiplic
	$\begin{bmatrix} 1 & 3 & 4 \end{bmatrix}$	ΓΟ Ο Ο ΓΙ Ο Ο Γ			Noncommutativity of	Noncommutativity
	$5 \ 2 \ 4$				multiplication of matrices	multiplication of ma
	1 9 6				matrices whose product is	matrices whose pro
					the zero matrix (restrict to	is the zero matrix (r
					square matrices of order	to square matrices
	7. Scalar matrix	8. unit matrix 9. upper and lower triangular			2).	order 2).
	F2 0 07	$\begin{bmatrix} 1 & 0 \end{bmatrix}$ $\begin{bmatrix} 1 & 0 \end{bmatrix}$ $\begin{bmatrix} 1 & 0 \end{bmatrix}$				
		71				
				•		

4	Determinants For every square matrix A = [a _{ij}] of order n, we can associate a number called determinant of square matrix. It is denoted by A or det(A). Evaluating Determinants (1) Order One: A = [a] A = a a] (3) Order Three: $ A = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix} = a_{11}a_{22} - a_{12}a_{21}$ $ A = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix} = a_{11}a_{22} - a_{12}a_{21}$ $ A = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix} = a_{11}a_{22} - a_{12}a_{21}$ $ A = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$ $ A = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix} = a_{11} \begin{vmatrix} a_{22} & a_{23} \\ a_{32} & a_{33} \end{vmatrix} - a_{12} \begin{vmatrix} a_{21} & a_{23} \\ a_{31} & a_{33} \end{vmatrix} + a_{13} \begin{vmatrix} a_{21} & a_{22} \\ a_{31} & a_{32} \end{vmatrix}$ $Properties Of Determinants$ $ a_{1} & a_{2} & a_{3} \\ b_{1} & b_{2} & b_{3} \\ c_{1} & c_{2} & c_{2} \\ c_{3} & c_{3} & c_{3} \end{vmatrix}$	April 05 Days, May- 05 Days	Through problems based on Matrix and Determinants, they will develop 1)Imagination 2)Systematic approach 3)To handle real life situatio	Students will able to describe 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. Solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.	Students would be to learn: Determinant of a so matrix (up to 3 x 3 matrices), minors, co-factors and applications of determinants in fin the area of a triang Adjoint and inverse square matrix. Consistency, inconsistency and number of solutions system of linear equations by examp solving system of lin equations in two or variables (having un solution) using inver a matrix.
5	$\begin{vmatrix} b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix} = \begin{vmatrix} a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ (2) Property 2: Interchanging any two rows/ columns $\begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix} = -\begin{vmatrix} b_1 & b_2 & b_3 \\ a_1 & a_2 & a_3 \\ c_1 & c_2 & c_3 \end{vmatrix}$ (3) Property 3: When any two rows/ columns are equal $\begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ b_1 & b_2 & b_3 \end{vmatrix} = 0$ $\begin{vmatrix} b_1 & b_2 & b_3 \\ b_1 & b_2 & b_3 \end{vmatrix} = 0$ Continuity and Differentiability	May-	To enable the	Students will be able to	Students would be
5		08Days,	students to	learn: Continuity and	to learn:

	Theorems Continuity Differentia	s on y and ability	June 10 Days	understand 1)Through problems based Rolles Theorem and Mean value Theorem imagination skills are imbibed.	differentiability, chain rule, derivative of inverse trigonometric functions, <i>x</i> , <i>x</i> and <i>x</i> , derivative of implicit functions. Concept of exponential and logarithmic functions. Derivatives of logarithmic	Continuity and differentiability, cha rule, derivative of in trigonometric funct: x, x and x , derivati implicit functions. Concept of exponen and logarithmic
	Rolle's Theorem Let f be a function that satisfies the following three hypothesis:1. f is continuous on the closed interval [a,b].2. f is differentiable on the open interval (a,b).3. $f(a) = f(b)$ Then there is a number c in (a,b) such that $f'(c) = 0$.	The Mean Value Theorem Let <i>f</i> be a function that satisfies the for hypothesis: 1. <i>f</i> is continuous on the closed interval [a,b]. 2. <i>f</i> is differentiable on the open interval (a,b). Then three is a number c in (a,b) such that $f'(c) = \frac{f(b) - f(a)}{b - a}$ $f(b) = f'(c)(b - a)$		2)Derivatives are used in economics to find out cost function and application skill will developed.	and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.	functions. Derivativ logarithmic and exponential function Logarithmic differentiation, deriv of functions express parametric forms. S
	Graphical Representation $f(x) \qquad \qquad$	Graphical Representation $y + \frac{1}{6} + \frac{1}$				
6	Applications of Derivatives		June 08 Days	Through problems based on AOD, they will develop 1)Imagination 2)Systematic approach 3)To handle real life situation	Learners will be able to understand the Applications of derivatives: increasing/decreasing functions, tangents and normal, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate	Students would be to Understand Applications of derivatives: increasing/decreasi functions, maxima minima (first deriva test motivated geometrically and se derivative test given provable tool). Simp problems (that illus

	decreasing Local maximum decreasing Local minimum Local minimum			basic principles and understanding of the subject as well as real life situations).	basic principles and understanding of th subject as well as re situations).
7	Integrals	July-15 Days	Through problems based on integration , they will develop 1)Manipulation (assumption) 2) Logical thinking 3) Systematic approach	Understand and appreciate the role of Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, properties of Definite integrals	Students would be to:- Understand and appreciate the role Integration as inver process of differenti Integration of a vari functions by substitution, by par fractions and by pa properties of Definit integrals

	(i) $\int \frac{dx}{x^2 - a^2} dx = \frac{1}{2a} \log \left \frac{x - a}{x + a} \right + C$ (ii) $\int \frac{1}{a^2 - x^2} dx = \frac{1}{2a} \log \left \frac{a + x}{a - x} \right + C$ (iii) $\int \frac{dx}{x^2 + a^2} dx = \frac{1}{a} \tan^{-1} \frac{x}{a} + C$ (iv) $\int \frac{1}{\sqrt{a^2 - x^2}} dx = \sin^{-1} \frac{x}{a} + C$ (v) $\int \frac{1}{\sqrt{x^2 - a^2}} dx = \log \left x + \sqrt{x^2 - a^2} \right + C$ (vi) $\int \frac{1}{\sqrt{x^2 + a^2}} dx = \log \left(x + \sqrt{x^2 + a^2} \right) + C$				
8	Applications of the Integrals y = f(x) x = a x' = 0 y = f(x) y = f(x) y = f(x) x = b x = b x' = 0 y = f(x) x = b x = b	July-04 Days, August- 05 Days	To enable the students to develop 1)Critical thinking to visualize shapes 2) Accuracy for calculating area	Students will able to define Applications in finding the area under simple curves, especially lines, parabolas; area of circles /ellipses (in standard form only) (the region should be clearly identifiable).	Students would be to define:- Applications in fin the area under sim curves, especially l parabolas; area of /ellipses (in standa form only) (the regi should be clearly identifiable).

9	Differential Equations	August- 13	To enable the	The students will be able	Students would be
		Days	students to	to define Definition, order	to define:
		5	understand	and degree, general and	Definition, order ar
			1)Different types	particular solutions of a	degree, general and
			solution	differential equation.	particular solution
			2)Different	Solution of differential	differential equatio
			approaches for	equations by method of	Solution of differen
			solution to	separation of variables,	equations by methe
			problem	solutions of homogeneous	separation of varia
				differential equations of	solutions of
				first order.	homogeneous diffe
					equations of first of



10	Vectors	September- 08 Days	Through the concept of vectors and its usage students will attain 1) Development of visualization 2)understanding need for different types of quantities	Students will be able to Understand the 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, vectors	Students would be to Understand the Vectors and scalars magnitude and dire of a vector. Directio cosines and directio ratios of a vector. To of vectors (equal, un zero, parallel and collinear vectors), position vector of a negative of a vector components of a ve addition of vectors, multiplication of a ve by a scalar, position vector of a point div a line segment in a ratio. Definition, Geometrical Interpretation, prop and application of s (dot) product of vec vectors
11	Three - dimensional Geometry	September- 02 Days October-08 Days	Through approach adopted for problems students will attain 1)Imagination 2)Systematic approach 3)Efficiency 4)Creativity	Students will be able to 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 two lines.	Students would be to understand Direction cosines as direction ratios of a joining two points. Cartesian equation vector equation of a skew lines, shortes distance between tw lines. Angle betwees lines.

	P(x, y, z) Z-coordinate y- x V-coordinate				
12	Linear Programming Liner programming problem aims at finding optimum solution for a giver linear function called the objective function subject to some given constraints on the variables Definition Linear Programming Constraints The linear inequalities or equations or restrictions on the variables of a linear	October-10 Days	Through this chapter students will attain 1) To handle optimization problems(Efficiency) 2) develop Systematic approach 3)Differentiate constraint from problem.	Students will be able to Understand 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).	Students would be to Understand Introduction, relate terminology such a constraints, objecti function, optimizati graphical method o solution for problem two variables, feasi and infeasible regio (bounded or unbou feasible and infeasi solutions, optimal feasible solutions (u three non-trivial constraints).
13	programming problem are called constraints. The conditions ×≥0, y≥0 are called non-negative restrictions. constraints as detrmined by a set of linear inequalities is called an optimization problem. Linear programming problems are a special type of optimization problems. Probability	October-06	Through this	Students will be able to	Students would be
		Days November-1 0 Days	chapter students will develop 1)Logical thinking	understand Conditional probability, multiplication theorem on	to understand Conditional probab multiplication theor

Introduction	to Handling Risk 2)Imagination for Manipulating	probability, independent events, total probability, Bayes' theorem, Random	on probability, independent events probability, Bayes'
Probability is the branch of mathematics concerning numerical descriptions of how likely an event is to occur, or how likely it is that a proposition is true. Probability = Member of Patternable Outcomes	situation for better result.	variable and its probability distribution, mean of random variable.	theorem, Random variable and its probability distribut mean of random var
Example: Let there be a basket with 3 balls: Red. Green. Blue: If you want to pick a red ball, we can calculate the probability of picking a red ball.			
Total number of possibilities = 3 Total number of favorable possibility = 1 Therefore. Probability of getting a red ball = 1/3			