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A square matrix in which every non - diagonal element is zero is called diagonal matrix.8. Every diagonal element of a skew symmetric matrix is Ans. Zero.9. If Find. Ans. 10. Ans. 11. If and A2 = I. Find relation given by a2=I. Ans. ATQ. 12. If the matrix A is both symmetric and skew symmetric, then A will be. Ans. A1 = A A1 = -A A = -A 2A = 0 A = 013. Matrices A and B will be inverse of each other only if Ans. AB = BA = I14. If A, B are symmetric matrices of same order, then AB - BA is a Ans. P = AB - BA 15. Diagonal of skew symmetric matrix are Ans. Zero16. If A and B are symmetric matrices of the same order, prove that AB + BA is symmetric Ans. Let 17. If Prove that A - At is a skew - symmetric matrix Ans. Prove18. If A is any square matrix, prove that AA1 is symmetric Ans. Let 19. Solve for x given that Ans. 2x - 3y = 1 x + y = 3 x = 3 - y 2 (3 - y) - 3y = 1 -5y = -5 y = 1 x = 3 - 1 x = 220. Give example of matrices such that AB = 0, BA = 0, A 0, B0 Ans. 21. Show that , is skew symmetric matrix. Ans. 22. Prove that is a symmetric matrix Ans. 23. If show that Ans. Prove24. Solve for x and y, given that Ans. x + 2y = 3 3y + 2x = 5 2x + 4y = 6 2x + 3y = 5 y = 1 x + 2 (1) = 3 x = 125. Given an example of matrix A and B such that AB = 0 but A 0, B 0 Ans. Back to Top 14 Marks Questions1. Find x and y if x + y = and x - y = Ans. 2. Show that f(x). f(y) = f(x+y) Ans. L.H.S = f(x). f(y) 3. If Find K. So that A2 = KA - 2I Ans. A2 = AA 4. Prove Ans. 5. Ans. Put L.H.S = R.H.S Hence prove6. Construct a 3 4 matrix, whose element are given by aij = Ans. Let 7. Obtain the inverse of the following matrix using elementary operations Ans. 8. Let Find a matrix D such that CD - AB = 0 Ans. Let 2a + 5c - 3 = 0 2b + 5d = 0 3a + 8c - 43 = 0 3b + 8d - 22 = 0 a = -191, b = -110, c = 77, d = 44 9. If , then prove that where n is any positive integer Ans. For n = 1 Hence result is true for n = 1 Let result is true for n = k now, we prove their result is true for n = k + 1 P (K + 1) is true Hence P (n) is true.10. For what values of x Ans. 4 + 2x + 2x = 0 4x - 4 = -111. Find the matrix X so that Ans. Let a = 1, b = -2, c = 2, d = 0 12. , Show that Where I is the identity matrix of order 2 and n N Ans. When n = 1 a1 + bA = a1 + bA L.H.S = R.H.S When n = k (a1 + bA)K = AK1 + KaK-1bA..... (i) Result is true for n = k When n = k + 1 (a1 + bA)(k+1) = (a1 + bA). (a1 + bA)k = (a1 + bA). (ak1 + kak-1ba) [From (i)] = a1 (ak1 + kak-1ba) + bA (ak1 + kak-1 ba) = ak+11 + kakba + akba + kak-1 b2A2 = ak+1 + (k+1) akba Hence result is true for n = k+1 When eves it is true for n = k13. Find the values of x, y, z if the matrix Satisfy the equation = I3 Ans. 14. If Show that A2 - 5A = 7I = 0 Ans. A2 - 5A + 7I = 0 A2 = 5A - 7I A2 = A2.A = (5A - 7I).A = 5A2 - 7AI .A = 5A2 - 7AI = 5A2 - 7A = 5(5A - 7I) - 7A = 25A - 35I - 7A = 18A - 35I A4 = A3.A = (18A - 35I).A = 18A2 - 35IA = 18(5A - 7I) - 35A = 90A - 126I - 35A = 55A - 126I 15. If A is a square matrix such that A2 = A, then (I + A)3 - 7A is equal to Ans. (I + A)3 - 7A = I3 + A3 + 3IA (I + A) - 7A = I + A3 + 3I2A + 3IA2 - 7A = I + A3 + 3A + 3A2 - 7A = I + A3 + 3A + 3A - 7A (A2 = A) = I + A3 - A = I + A2 - A = I + A - A (A2 = A) = I16. Construct 23 matrix whose element aij are given by Ans. For i = j aij = 4i j a11 = 4 1 = 4 a22 = 42 2 = 16 For i < j aij = 2i + j a12 = 2 1 + 2 = 4 a13 = 2 1 + 3 = 5 a23 = 2 2 + 3 = 7 For i > j aij = 1 + 2j a21 = 2 + 2 1 = 4 17. If then show that A3 - 23A - 40I = 0 Ans. 18. Express the matrix as the sum of a symmetric and a skew symmetric matrix. Ans. Let is a symmetric matrix Let This is a skew symmetric matrix 19. If Ans. For n = 1 Result is true for n = 1 Let it be true for n = k Thus result is true for n = k+1 Whenever it is true for n = k20. If then find the matrix X such that 2A + 3X = 5B. Ans. 3X = 5B - 2A 21. If then prove that Ans. For n = 1 Result is true for n = 1 Let result is true for n = k Thus result is true for n = k + 1 Whenever result is true for n = k22. Find X and Y, if 2x + 3y = Ans. On adding 23. If Show that AB is a zero matrix if and differ by an odd multiple of Find the condition for which AB=0 Ans. is odd multiple of 24. If f(x) = x2 - 5x + 7 and find f(A) Ans. f(A) = A2 - 5A + 7I f(A) = A2 - 5A + 7I 25. find x and y such that A2 - A + yI = 0 Ans. x = 9 y = 14 NCERT Class 12 Maths Ch 3 is one of the most important ones in the NCERT syllabus. Duly following NCERT Solutions for Class 12 Maths Chapter 3 ensures you that there will be no hindrance when you opt for more advanced branches of Maths. Class 12 Maths Chapter 3 - Matrices solved by Expert Teachers as per NCERT (CBSE) Book guidelines. All Matrices Exercise Questions with Solutions to help you to revise complete Syllabus and Score More marks. Ans. Using Mathematical Induction, we see the result is true for For Given: is true, i.e. To prove: Proof: L.H.S. = = = = = R.H.S. Thus, is true, therefore, is true. Ans. Given: A =(i) Let = is true for Now(ii) Multiplying eq. (ii) by Eq. (i), = Therefore, is true for all natural numbers by P.M.I. Ans. Given: A' = which is true for Now,(i) Again(ii) [From eq. (i)] = Therefore, the result is true for Hence, by the principal of mathematical induction, the result is true for all positive integers Ans. A and B are symmetric matrices. A' = A and B' = B(i) Now, (AB - BA)' = (AB)' - (BA)' (AB - BA)' = B'A' - A'B' [Reversal law] (AB - BA)' = BA - AB [Using eq. (i)] (AB - BA)' = -(AB - BA) Therefore, (AB - BA)' = -(AB - BA) Therefore, (AB - BA) is a skew symmetric. Ans. (P'AB)' = B'(AB)' = (AB)' (B')' [(CD)' = D'C'] (B'AB)' = B'A'B'(i) (Case I: A is a symmetric matrix, then A' = A From eq. (i) (B'AB)' = B'AB B'AB is a symmetric matrix. Case II: A is a skew symmetric matrix. A' = -A Putting A' = -A in eq. (i), (B'AB)' = B'(-A)B = -B'AB B'AB is a skew symmetric matrix. Ans. Given: A = A' = Now A'A = I Equating corresponding entries, we have And And , , Ans. Given: Equating corresponding entries, we have Ans. Given: A = A2 - 5A + 7I = = = = = 0 = R.H.S. Proved. Ans. Given: Equating corresponding entries, we have Market Products. I. 10,0002,00018,000II. 6,00020,0008,000(a) If unit sales prices of and are ` 2.50, ` 1.50 and ` 1.00 respectively, find the total revenue in each market with the help of matrix algebra.(b) If the unit costs of the above three commodities are ` 2.00, ` 1.00 and 50 paise respectively. Find the gross profit. Ans. According to question, the matrix A = (a) Let B be the column matrix representing sale price of each unit of products Then B = Now Revenue = Sale price c Number of items sold = = Therefore, the revenue collected by sale of all items in Market I = ` 46,000 and the revenue collected by sale of all items in Market II = ` 53,000.(b) Let C be the column matrix representing cost price of each unit of products Then C = Total cost = AC = = = The profit collected in two markets is given in matrix form as Profit matrix = Revenue matrix - Cost matrix Therefore, the gross profit in both the markets = ` 15000 + ` 17000 = ` 32,000. Ans. Given: X =(i) Putting X = in eq. (i), Equating corresponding entries, we have(ii)(iii)(iv)(v).....(vi)(vi) Solving eq. (ii) and (iii), we have and Solving eq. (v) and (vi), we have and Putting these values in X = , X = Ans. Given: AB = BA(i) Let(ii) For Multiplying both sides by B, [From eq. (i)] is also true. Therefore, is true for all N by P.M.I.(A) (B) (C) (D) Ans. Given: A = and A2 = I Equating corresponding entries, we have Therefore, option (C) is correct. (A) A is a diagonal matrix (B) A is a zero matrix (C) A is a square matrix (D) None of these Ans. Since, A is symmetric, therefore, A' = A(i) And A is skew-symmetric, therefore, A' = -A A = -A [From eq. (i)] A + A = 0 2A = 0 A = 0 Therefore, A is zero matrix. Therefore, option (B) is correct.(A) (B) I - AC) (D) 3 Ans. Given: A2 = A(i) Multiplying both sides by A, A3 = A2 = A [From eq. (i)](ii) Also given (I + A)3 - 7A = I3 + A3 + 3I2A + 3IA2 - 7APutting A2 = A [from eq. (i)] and A3 = A [from eq. (ii)], = I + A + 3IA + 3IA - 7A = I + A + 3A + 3A - 7A [IA = A]= I + 7A - 7A = I Therefore, option (C) is correct. NCERT 12 Mathematics Text book Solutions NCERT 12th class Mathematics book solutions are available in PDF format for free download. These ncert book chapter wise questions and answers are very helpful for CBSE board exam. 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Continuity and Differentiability 5.1 Introduction 5.2 Continuity 5.3 Differentiability 5.4 Exponential and Logarithmic Functions 5.5 Logarithmic Differentiation 5.6 Derivatives of Functions in Parametric Forms 5.7 Second Order Derivative 5.8 Mean Value Theorem 6. Application of Derivatives 6.1 Introduction 6.2 Rate of Change of Quantities 6.3 Increasing and Decreasing Functions 6.4 Tangents and Normals 6.5 Approximations 6.6 Maxima and Minima 7. Integrals 7.1 Introduction 7.2 Integration as an Inverse Process of Differentiation 7.3 Methods of Integration 7.4 Integrals of some Particular Functions 7.5 Integration by Partial Fractions 7.6 Integration by Parts 7.7 Definite Integral 7.8 Fundamental Theorem of Calculus 7.9 Evaluation of Definite Integrals by Substitution 7.10 Some Properties of Definite Integrals 8. Application of Integrals 8.1 Introduction 8.2 Area under Simple Curves 9. Differential Equations 9.1 Introduction 9.2 Basic Concepts 10 Vector Algebra 10.1 Introduction 10.2 Some Basic Concepts 10.3 Types of Vectors 10.4 Addition of Vectors 10.5 Multiplication of a Vector by a Scalar 10.6 Product of Two Vectors 12. Linear Programming 12.1 Introduction 12.2 Linear Programming Problem and its Mathematical Formula 12.3 Different Types of Linear Programming Problems 13. Probability 13.1 Introduction 13.2 Conditional Probability 13.3 Multiplication Theorem on Probability 13.4 Independent Events 13.5 Bayes' Theorem 13.6 Random Variables and its Probability Distributions 13.7 Bernoulli Trials and Binomial Distribution NCERT Solutions Chapter 3 Matrices The knowledge of matrices is necessary in various branches of mathematics. Matrices are one of the most powerful tools in mathematics. This mathematical tool simplifies our work to a great extent when compared with other straight forward methods. The evolution of concept of matrices is the result of an attempt to obtain compact and simple methods of solving system of linear equations. Matrices are not only used as a representation of the coefficients in system of linear equations, but utility of matrices far exceeds that use. Matrix notation and operations are used in electronic spreadsheet programs for personal computer, which in turn is used in different areas of business and science like budgeting, sales projection, cost estimation, analysing the results of an experiment etc. Also, many physical operations such as magnification, rotation and reflection through a plane can be represented mathematically by matrices. Matrices are also used in cryptography. This mathematical tool is not only used in certain branches of sciences, but also in genetics, economics, sociology, modern psychology and industrial management. 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