**Chapter 5: Matrices Test A** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Simple familiar*

|  |  |  |  |
| --- | --- | --- | --- |
|  | State the order of the following matrix. | There are 4 rows and 2 columns.  The order is 4 × 2. | 1 |
|  | Matrix *M* has order  and matrix *N*  has order . If , what is the  order of ? | Must be the same  Order of the answer  *Q* has order 5 × 1. | 1 |
|  | State the element  for the matrix . | means the element in row 2 and column 1. | 1 |
|  | Calculate  if ,  and . |  | 1 |
|  | Determine the values of *x* and *y* if . | and | 1 |
|  | If , evaluate . |  | 1 |
|  | If , calculate the determinant of *P*, . |  | 1 |
|  | Find the multiplicative inverse of matrix , *C*−1. |  | 1 |
|  | Write the following simultaneous equations as a matrix equation, in the form . |  | 1 |
|  | Determine the matrix solution for the following simultaneous equations: |  | 1 |
|  | Consider  and .  (a) Find *AB*.  (b) Comment on the solution. What does this tell you about matrices A and B? | (a)  This is the identity matrix.  (b)  means  or . | 2 |
|  | Determine the solution to the matrix equation  in terms of . |  | 1 |

**Chapter 5: Matrices  Test A** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Complex familiar*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Let . Determine the value of  , given |  | 1 |
|  | Find the inverse of . |  | 1 |
|  | Consider the matrix below.    (a) Calculate , the determinant of .  (b) Calculate , the inverse of .  (c) State . | (a)  (b)  (c)  or | 3 |
|  | Consider the pair of linear equations shown.    (a) Transpose the equations so they are in the form .  (b) Show the equations in matrix form.  (c) Use matrix methods to find the coordinates of the point (*x*, *y*) where the graphs of the two linear equations intersect. | (a)  (b)  (c)  The coordinates of the point of intersection are (2, –1). | 3 |

**Chapter 5: Matrices  Test A** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Complex unfamiliar*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Solve the following matrix equation to find the values of *a*, *b*, *c* and *d*. | , , , | 4 |
|  | (a) Consider the equation  where , ,  and .  (i) Express  in terms of   and .  (ii) Hence, solve the equation to obtain the matrix .  (b) (i) Expand .  (ii) If , state  in terms of . | (a) (i)    (ii) Equate like components.    and    Hence, .  (b) (i)  (ii)  and ;  therefore, . | 4 |
|  | (a) Determine the value of  for which the matrix  will be singular.  (b) Hence, determine the values of  and  for which the system of simultaneous equations    will have:  (i) a unique solution  (ii) no solutions  (iii) infinitely many solutions. | (a) The matrix is singular if its determinant is zero. The determinant is .    Hence, the matrix is singular if .  (b) (i) The system of equations is:  From part (a), if , there cannot be a unique solution.  (ii) If , the system of equations becomes:    For no solutions,  .  Hence, there are no solutions if  and .  (iii) For infinitely many solutions,   and . | 6 |
|  | Alisha and her friends go to the cinema. Four friends in the group pay full price, three pay the student rate and one pays the child rate. The total cost of their tickets is $68.  Jarrod goes with some of his friends and the cost is $41.50. In his group of 7, five pay the student rate and the rest pay the child rate.  A family with two adults, two students and two children pay a total of $44.  Set up a matrix equation to find the prices of the three types of tickets. | Ticket price for full (adult) rate = *A*  Ticket price for student rate = *S*  Ticket price for child rate = *C*        Ticket price for full (adult) rate = $11.00  Ticket price for student rate = $6.50  Ticket price for child rate = $4.50 | 3 |