***Section* 1.7 – Cramer’s Rule**

**Cramer’s Rule**

***Theorem***

If  is a system of a linear equations in *n* unknowns such that , then the system has a unique solution. This solution is









Where 



***Example***

Use Cramer’s rule to solve



***Solution***









 





***Solution***: 

***Example***

Use Cramer’s Rule to solve.



***Solution***









 



 



 



***Solution***: 

**A Formula for** 

***Theorem***: ***Inverse of a matrix using its Adjoint***

The  entry of  is the cofactor  divided by det(***A***):

***Formula for*** : 



***Example***

Find the inverse matrix of using its adjoint.

***Solution***

  

  

  







***Theorem***

If *A* is an  matrix, then the following statements are equivalent

1. *A* is invertible
2. *A****x*** = 0 has only the trivial solution
3. The reduced row echelon form of *A* is 
4. *A* can be expressed as a product of elementary matrices
5. *A****x*** = ***b*** is consistent for every  matrix ***b***
6. 

***Exercises Section* 1.7 – Cramer’s Rule**

1. Use Cramer’s Rule with ratios  to solve *A****x*** *= b*. Also find the inverse matrix . Why is the solution ***x*** is the first part the same as column 3 of ? Which cofactors are involved in computing that column ***x***?



1. Verify that  and determine whether the equality  holds



1. Verify that 

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(**4 − 58**) Use Cramer's rule to solve the system

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1. Show that the matrix *A* is invertible for all values of *θ*, then find  using 

