Math 2318 – Linear Algebra ***Exam* 1** ***Review***

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1. Solve the Solve the system by Gaussian elimination





1. Given the matrices





1. Find the inverse of the following matrices if they exist.

***a***)  ***b***)  ***c***) 

1. Evaluate the determinant

***a***)  ***b***)   ***d***)  ***e***) 

1. Find  by inspection

 

1. Find the components of the vector  with initial point  and terminal point 
2. Find ***u*** × ***v***, where  and show that ***u*** × ***v***  is perpendicular to ***u*** and to ***v***.
3. Calculate the scalar triple product  of the vectors:
4. 
5. 
6. Given  Compute the vectors
7. ***u*** × ***v***
8. ***v*** × ***w***
9. ***u*** × **(*v*** × ***w*)**
10. **(*u*** × ***v*)** × ***w***
11. ***u*** × **(*v*** −2 ***w*)**
12. 
13. Unit vector of ***u***, ***v***, and ***w***
14. Anglebetween ***v***, and ***w***
15. 
16. 
17. 
18. Determine whether the vectors form an orthogonal set
19. 
20. 
21. 
22. Find the vector component  of ***u*** along ***a*** and the vector component of ***u*** orthogonal to ***a***.
23. 
24. 
25. 
26. 

1. Find the area of the parallelogram determined by the given vectors 
2. Use the cross product to find a vector that is orthogonal to both 
3. Find the area of the triangle with the given vertices:
4. 
5. 
6. Find the volume of the parallelepiped with sides ***u***, ***v***, and ***w***.



1. Express  in terms of  and 

***Prove*:**

1. 
2. 
3. If *A* is invertible and , prove that 
4. Prove if , then *A* is symmetric and 
5. 
6. 
7. 
8. If ***u*** and ***v*** are nonzero vectors such that , then ***u*** and ***v*** are orthogonal.
9. Prove that  *iff* ***u*** and ***v*** are parallel vectors.
10. Lagrange’s identity: 

***Solution***

1. 



1.    

   

 

1. *a*)  *b*)  *c*) 
2. ***a****) −*109 ***b***)   ***d***)  ***e***) 0
3. 



1. (5, 6, −12)
2. (2, −7, −6), ***u*** × ***v***  is orthogonal to both ***u*** and ***v***.
3. *a*) 49 *b*) −92
4.   

  



   

1. 
2.  

 

1. 
2. 
3. 
4. 16
5. 