Math 2318 – Linear Algebra ***Exam* 3** ***Review***

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1. Find the characteristic equation, eigenvalues, and eigenvectors of 
2. Find the characteristic equation, eigenvalues, and eigenvectors of 
3. Find the eigenvalues, and eigenvectors of 
4. Find the characteristic equation, eigenvalues, and eigenvectors of 
5. Find the characteristic equation, eigenvalues, and eigenvectors of 
6. Find a matrix *P* that diagonalizes 
7. Let , determine when *A* is diagonalizable, not diagonalizable. (*Hint: discriminant of the characteristic equation*)
8. Show that and  are not similar matrices
9. Let  be the Euclidean inner product on , and let , , and . Verify the following for the weighted Euclidean inner product
10.  *b)* 
11. Which of the following form orthonormal sets?
12.  in 
13. 
14. Use the Gram-Schmidt process to find an orthonormal basis for the subspaces of .
15. 
16. 
17. 
18. 
19. Find the ***QR***-decomposition of

*a*)  *b*) 

1. Determine if the matrix is orthogonal. For those that is orthogonal find the inverse
2.  *b*) 
3. 
4. Show that the matrix  is not diagonalizable
5. Show that the function  given the formula  is linear transformation
6. Determine whether the function  is linear transformation

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1. Consider the basis for , where  and let  be the linear transformation for which



Find a formula for , and then use that formula to compute 

***Solution***

1.   
2.   
3.   
4.   
5.   
6. 
7. 
8. 
9. 
10. 
11. 







1. 



1. 

  


1.  repeated eigenvalues therefore is not diagonalizable
2. Let 

















Since  and , then function *T* is a linear transformation.

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| --- |
| ***√***          ***√***              It is not a linear transformation |
|  |

1. 

