**Assignment 2**

1. Consider the triangle with vertices P(2, 0, −3), Q(5, −2, 1), and R(7, 5, 3).

a. Show that it is a right-angled triangle.

b. Find the lengths of the three sides and verify the Pythagorean theorem.

2. In each case, compute the projection of u on v.



3. For what values of k are  and  orthogonal?

4. In each case, find a vector equation of the line.

a. Passing through P(3, −1, 4) and perpendicular to the plane 3x−2y−z = 0.

5. Find an equation of each of the following planes.

a. Passing through A(2, 1, 3), B(3, −1, 5), and C(1, 2, −3).

b.



6. In each case determine whether U is a subspace of R3

. 

7. Use Theorem 5.2.3 to determine if the following sets of vectors are a basis of the indicated space.





8. Each case find dimension and a basis of the subspace U.



b. 

9. Find all values of x such that the following sets of vectors is linearly independent

1. 
2. 

10. Find the value(s) of t for which (1,3,-2,2t) lies in the subspace spanned by (1,1,2,2), (1,3,2,2), and (1,4,3,3).

11. Find the value(s) of t for which (1,1,t-2) lies in the subspace spanned by (1,2,1), (-1,5,2)

12. In each case find dimension and bases for the row and column spaces of A and determine the rank of A.

 

13. Find a basis and calculate the dimension of the following subspaces of  .



14. Find a basis and calculate the dimension of the following subspaces of 



15. In each case find a basis of the null space of A. Then compute rank A

 