Chapter 1

Multiple Choice

1. Which of the following is not a subspace of ?

A. The set of all vectors in  whose third component is 0.

B. The set of all vectors in whose second component is 5.

C. The set of all vectors in  whose first component is twice the second component.

D. The set of all vectors in whose second component is equal to the third component minus the first component.

Ans: B

2. Which of the following is a subspace of ?

A. The set of all vectors in  whose second component is equal to 5 less than the first component.

B. The set of all vectors in  whose first component is equal to the square of the third component.

C. The set of all vectors in whose second component is 2 times the first component minus 3 times the third component.

D. The set of all vectors in  with nonnegative components.

Ans: C

3. Determine which of the following is a basis for the subspace of solutions of the system of equations: 

A. 

B. 

C. 

D. 

Ans: A

4. Which of the following is orthogonal to the vector ?

A. 

B. 

C. 

D. 

Ans: C

Short Answer

5. Determine the equation of the polynomial of degree two whose graph passes through the points (-2,10), (3, 20), and (1, -2).

Ans: 

6. Determine the equation of the polynomial of degree three whose graph passes through the points (2, -1), (-1, 11), (1, 3), and (3, -13).

Ans: 

7. For the following matrix, give the size and the (3,2) element.



Ans: size: 

(3,2) element: 2

8. Determine the augmented matrix for the following system of equations:



Ans: 

9. Solve the following system using the method of Gauss-Jordan elimination.



Ans: 

10. Rewrite the following matrix in reduced echelon form.



Ans: 

11. Solve (if possible) the following system of equations using the method of Guass-Jordan elimination.



Ans: 

12. Solve (if possible) the following system of equations using the method of Guass-Jordan elimination.



Ans: No solution

13. Compute the following linear combinations for .

A. 

B. 

C. 

Ans:

A. (-4,3)

B. (-15,10)

C. (-13,17)

14. Compute the following linear combinations for .

A. 

B. 

Ans:

A. (-4,2,2)

B. (-12,-12,12)

15. Write the vector  as a linear combination of the vectors  and .

Ans: 

16. Write the vector  as a linear combination of the vectors , and .

Ans: 

17. Determine whether the sets defined by the following vectors are subspaces of 

A. 

B. 

C. 

D. 

Ans:

A. yes

B. no

C. yes

D. yes

18. Consider the sets of vectors of the following form. Each set forms a subspace of  Determine the dimension of each subspace.

A. 

B. 

C. 

Ans:

A. 1

B. 2

C. 1

19. Determine whether the following sets of vectors are linearly dependent or independent in 

A. 

B. 

Ans:

A. Linearly independent

B. Linearly dependent

20. Determine whether the following sets of vectors are linearly dependent or independent in 

A. 

B. 

Ans:

A. Linearly independent

B. Linearly dependent

21. Determine the dot product of the following pairs of vectors.

A. 

B. 

Ans:

A. -2

B. 15

22. Normalize the following vectors.

A. (5,-7)

B. (3,4,-2)

Ans:

A. 

B. 

23. Determine the angles between the vectors  and .