Algebra_Assignment 1

Q1:

In each case determine whether U is a subspace of R^3. **Explain your answer.**

a/ $U=\{(1,s,t)\mid s \text{ and } t \text{ in } \mathbb{R}\}$

b/ $U=\{(0,s,t)\mid s \text{ and } t \text{ in } \mathbb{R}\}$

c/ $U=\{(r,s,t)\mid r,s \text{ and } t \text{ in } \mathbb{R}, -r+3s+2t=0\}$

d/ $U=\{(r,3s,r-2)\mid r \text{ and } s \text{ in } \mathbb{R}\}$

e/ $U=\{(r,0,s)\mid r^2+s^2=0,\ r \text{ and } s \text{ in } \mathbb{R}\}$

f/ $U=\{(2r,-s^2,t)\mid r,s \text{ and } t \text{ in } \mathbb{R}\}$

g/ $U=\{(2+a,b-a,b)\mid a,b\in\mathbb{R}\}$

h/ $U=\{(a+b,a,b)\mid a,b\in\mathbb{R}\}$

i/ $U=\{(2a+b,0,b)\mid a,b\in\mathbb{R}\}$

Algebra_Assignment 1

Q2:

Let $x=(-1,-2,-2), u=(0,1,4), v=(-1,1,2)$ and $w=(3,1,2)$.

Find scalars a, b and c such that $x=au+bv+cw$

Q3:

Write v as a linear combination of u and w, if possible, where $u=(1,2), w=(1,-1)$

a/ $v=(0,1)$ b/ $v=(2,3)$ c/ $v=(1,4)$ d/ $v=(-5,1)$

Algebra_Assignment 1

Q4:

Find all values of m for which x lies in the subspace spanned by S

a/ $x = (-3, 2, m)$ and $S = \{(-1, -1, 1), (2, -3, -4)\}$

b/ $x = (4, 5, m)$ and $S = \{(1, -1, 1), (2, -3, 4)\}$

c/ $x = (m+1, 5, m)$ and $S = \{(1, 1, 1), (2, 3, 1), (3, 4, 2)\}$

d/ $x = (3, 5, 7, m)$ and $S = \{(1, 1, 1, -1), (1, 2, 3, 1), (2, 3, 4, 0)\}$

Algebra_Assignment 1

Q5:

Determine whether the set S is linearly independent or linearly dependent

a/ $S = \{(-1,2),(3,1),(2,1)\}$

b/ $S = \{(-1,2,3),(3,1,1),(1,3,5)\}$

c/ $S = \{(1,-2,2),(2,3,5),(3,1,7)\}$

d/ $S = \{(-1,2,1),(2,4,0),(3,1,1)\}$

e/ $S = \{(1,-2,2,1),(1,2,3,5),(-1,3,1,7)\}$

Q6:

For which values of k is each set linearly independent ?

a/ $S = \{(-1,2,1),(k,4,0),(3,1,1)\}$

b/ $S = \{(k,1,1),(1,k,1),(1,1,k)\}$

c/ $S = \{(1,2,1,0),(-2,1,1,-1),(-1,3,2,k)\}$