**MOYEDE PRAISE ADEBOLA**

**COMPUTER SCIENCE**

**MAT 204 ASSIGNMENT**

**18/SCI01/053**

**ANSWERS**

1. A vector space over a real field F is a set that is closed under finite vector addition and scalar multiplication.

2. αA + βB + Δc

α+ β

1

1

1

1

+

δ

1

2

5

3

8

a

b

c

=

α + β + δ = a – (1) α + 2β + 5δ = b – (2) α + 3β + 8δ = c – (3)

from eqn (1)

α = a - β - δ – (4)

put (4) in (2) and (3)

α + 2β + 5δ = b (a - β - δ) + 2β + 5δ = b a - β - δ + 2β + 5δ = b a + β + 4δ = b - a –(5)

α + 3β + 8δ = c

(a - β - δ) + 3β + 8δ = c a - β - δ + 3β + 8δ = c

a + 2β + 7δ = c - a –(6)

combine equation (5) and (6)

 β + 4δ = b - a – (5)

-

 2β + 7δ = c - a – (6)

Multiply equation (5) by 2 and equation (6) by 1

= 2β + 8δ = 2b – 2a

- 2β + 7δ = c – a δ = (2b – 2a) – (c – a)

δ = 2b – 2a – c + a δ = 2b – a – c δ = -a + 2b – c

From equation (5)

β + 4δ = b - a

Substitute the value of δ

= β + 4( -a + 2b –c) = b – a β - 4a + 8b –4c = b – a

β = 4a - 8b + 4c = b – a β = 3a - 7b + 4c

From equation (4)

α = a - β - δ α = a - (3a - 7b + 4c) - (-a + 2b – c) α = a - 3a + 7b - 4c +a - 2b + c

= -a + 5b -3c

3.

First check for linear dependency αP + βQ + δR

α+ β

1

2

3

3

+

δ

0

2

0

1

1

0

0

0

=

α + 3β = 0 – (1) 2α + 2β = 0 – (2)

 3α + β + δ = 0 – (3)

From eqn (1) α + β = 0

Substitute eqn (1) in (2) and (3)

2α + 2β = 0

2(-3β) + 2β = 0

-6β + 2β = 0 -4β = 0 β = 0 Substitute values of β into (2)

α + 3β = 0 α + 0 = 0 α = 0

Substitute α and β into equation (3)

3α + β + δ = 0 3(0) + 0 + δ = 0 δ = 0

α + 3β = p – (1) 2α + 2β = q – (2)

 3α + β + δ = r – (3)

Combine equations (1) and (2) α + 3β = p x1

 2α + 2β = q x2

Multiply equations (1) by 2 and (2) by 1

2α + 6β = 2p

- 2α + 2β = q

4β = 2p – q

 4 4

β = 2p – q

4

Substitute value of β into (1)

α + 3β = p

α +

α

+

3

2

p

–

q

=

p

4

6

p

–

3

q

=

p

4

p

-

6

p

–

3

q

1

4

α

=

α =

α = 4p – 6p + 3q

4

α = –2p + 3q

4

In equation (2)

3α + β + δ = r δ = r - 3α – β δ = r - 3 -2p + 3q

-

2

p

–

q

1

4

4

δ =

δ = 4r + 6p - 9q – 2p + q

4 δ = 4r + 4p - 8q

4 δ = 4p - 8q + 4r

4