

First Semester

Second Quiz

King Saud University

(without calculators)

Time: 20 mins.

College of Science

Monday 8-4-1445

240 Math

Math. Department

Name:

ID no.:

Q1: Let V be any nonempty set which has two operations are defined: addition and scalar multiplication. State the 10 axioms that should be satisfied by all scalars and all objects in V that make V a vector space. (5 marks)

Solution

Q1 For all $u, v, w \in V$ and $k, m \in \mathbb{R}$:

- 1- $u+v \in V$
- 2- $u+v=v+u$
- 3- $u+(v+w)=(u+v)+w$
- 4- there is a zero vector 0 in V such that $u+0=u$ for all $u \in V$
- 5- for each vector u in V , there is a negative vector $-u$ such $u+(-u)=0$
- 6- $ku \in V$
- 7- $k(u+v)=ku+kv$
- 8- $(k+m)u=ku+mu$
- 9- $k(mu)=(km)u$
- 10- $1u=u$