**AZERBAIJAN STATE OIL INDUSTRY UNIVERSITY**

**ANALYTIC GEOMETRY INDEPENDENT WORK**

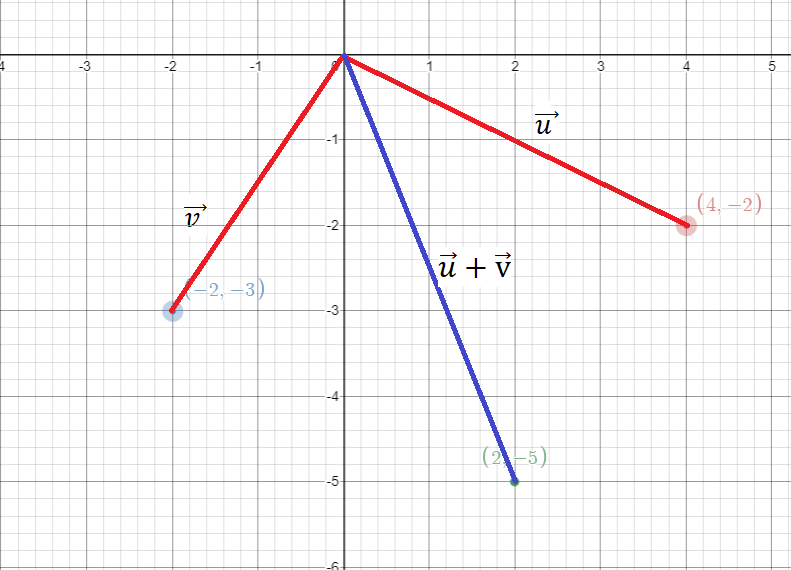
**Group:604.20E**

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**1**. Find the sum of the vectors and illustrate the indicated vector operations geometrically:

***Solution:***

u + v = (4-2,-2-3) = (2,-5)



**2**. Write the vector as a linear combination of the vectors and if possible:

(Hint: linear combination of vectors and is a vector , where and are real scalars.)

***Solution*:**

The solution set is:

**3**. Determine whether the set with the operations

and

is a vector space. If it is, verify each vector space axiom; if it is not, state all vector space axioms that fail.

***Solution:***

Consider the definition of a vector space as represented below. Let V be a set on which two operations (vector addiction and scalar multiplication) are defined.If the listed axioms are satisfied for every u,v and w in V and every scalar (real number) c and d, then V is a vector space.

*Vector addiction:*

**1.u**+**v** is in V. Closure under addition

**2.u**+**v** = **v**+**u** Commutative property

**3.**(**u**+**v**)+**w** = **u**+(**v**+**w**) Associative property

**4.**V has a **zero vector 0** such that Additive identity

for every **u** in V, **u+0 = u**

**5.**For every **u** in V, there is a vector Additive inverse

İn V denoted by **-u** such that,

**u+(-u) = 0**

*Scalar multiplication:*

**6**. c**u** is in V. Closer under scalar multiplication

**7**. c(**u**+**v**) = c**u**+c**v** Distributive property

**8.**(c+d)**u** = c**u**+d**u** Distributive property

**9.** c(d**u**) = (cd)**u** Associative property

**10.** 1(**u**) = **u** Scalar identity

**4**. Vector has initial point and terminal point . Which of the following vectors is (are) parallel to ?

***Solution:***

P = (2,-1,3) Q = (-4,7,5)

w = (-4-2,7+1,5-3) 🡪 w = (-6,8,2)

Vector **u** is parallel to **w**.

Vector **v** is not parallel to **w**.

Vector **z** is not parallel to **w.**

**5**. If the points

are collinear for three distinct values , and , then show that

***Solution:***

It is given that 3 points are collinear. A,b,c are distinct and

are collinear if

Then,

= 0

Expanding along the 3rd column we have,

**PROOFS**

**DOT PRODUCT**

**1.**

**2.**

**CROSS PRODUCT**