

College - math problem example

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Math Challenge Vectors: Explanation: Although the vectors QR and RQ refer to the same segment between the points R and Q, they are two distinct vectors and can not be considered equivalent. It happens because a vector is characterized by both numerical value and vector's direction. Vectors QR and RQ have exactly the same length but opposite direction and, therefore, differ from each other.

" Blog"-version:

9: 30

I was puzzled to find out that the vectors connecting the same two points (let's say QR and RQ) are not equivalent. How can it happen It seems so logical to assume that if two endpoints are the same, the segment between them is the same also. Can somebody help me with this issue

9: 50

Hi! It is simple, though unusual. Vectors differ from many other mathematical notions because a vector is determined by both numerical value and vector's direction. So, vector is not only a number. You can imagine a vector as an arrow of certain length.

10: 13

So, if the same point is start for one vector and ending point for another one and vice versa, even if these two vectors have the same length, they would not be equivalent

10: 28

Exactly! You can compare it with buses that have the same route but go in the opposite direction. If you stand at a bus stop waiting for the bus to go to

the nearby town, it does not help you if exactly the same minute the bus leaves the town of your destination and heads the other way. Although it is the same bus, you can not ride it as it goes in the different direction. The straight-line movement of the bus can be characterized by a vector.

11: 05

Thanks a lot!

2. Elimination or substitution method for solving a system of equations:

To determine whether it is better to use elimination or substitution method to solve a system of equations, first of all, it is advisable to examine closely the coefficients in the equations of the original system.

If the coefficients before one of the variables in two of the equations are the same, but have the opposite sign (or have the same sign - then one of the equations should be simply multiplied by -1) then it would be more practical to use the elimination method. This method is also handy for solving bigger systems that contain three or more variables. If in one of the equations coefficients of some of the variables are multiples of the corresponding coefficients in another equation, the elimination method allows significant simplification of the original system.

A good sign that the substitution method of solving a system of equations would be appropriate to use is the fact that in one of the equations one of the variables stands alone on one side of equation. However, the fact that it happens not so often does not mean that the substitution method is used rarely. An equation can be transformed to such a form. If such a transformation is easy and one of the variables can be quickly expressed as equal to some combination of other variables and numbers, the substitution method is a right choice to be made.

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Easy transformations are usually possible when one of the variables has a coefficient of ± 1 or coefficients of most other variables are multiples of it or if several variables have coefficient of 0.