

You have been introduced to the vector, using both the component form and the standard form using $\mathbf{i}, \mathbf{j}$. Remember a two dimensional vector $\mathbf{v}$ can be represented as

$$\mathbf{v} = \langle a, b \rangle = a\mathbf{i} + b\mathbf{j}$$

Please do the following in your groups:

1. Discuss how a vector could be multiplied with another vector, i.e. discuss what the definition $\mathbf{u} \cdot \mathbf{v}$ means or could be for vectors. There are multiple possibilities here...
2. After your discussion select one definition for the rest of the exercise.
3. Is the definition that you selected commutative? That is, does $\mathbf{u} \cdot \mathbf{v} = \mathbf{v} \cdot \mathbf{u}$?
4. Is the definition that you selected associative? That is, does $\mathbf{u} \cdot (\mathbf{v} \cdot \mathbf{w}) = (\mathbf{u} \cdot \mathbf{v}) \cdot \mathbf{w}$?
5. Is the definition that you selected distributive? That is, does $\mathbf{u} \cdot (\mathbf{v} + \mathbf{w}) = \mathbf{u} \cdot \mathbf{v} + \mathbf{u} \cdot \mathbf{w}$?
6. Does the definition that you selected have an identity element? That is, is there a certain vector $\mathbf{u}$ such that $\mathbf{u} \cdot \mathbf{v} = \mathbf{v}$ for any $\mathbf{v}$? The identity element for normal multiplication is 1, that is $1 \cdot a = a$ for any number a .