THEOREM (Properties of Vector Operations)

Let $\underline{u}$, $\underline{v}$ and $\underline{w}$ be any 3 vectors in the plane, and let c and d be real numbers.

1. Commutativity of addition: $\underline{u} + \underline{v} = \underline{v} + \underline{u}$
2. Associativity of Addition: $(\underline{u} + \underline{v}) + \underline{w} = \underline{u} + (\underline{v} + \underline{w})$
3. Additive Identity Property: $\underline{u} + \underline{0} = \underline{u}$
4. Additive Inverse Property: $\underline{u} + (-\underline{u}) = \underline{0}$
5. : $c(d\underline{u}) = (cd)\underline{u}$
6. Distributive Property 1: $(c+d)\underline{u} = c\underline{u} + d\underline{u}$
7. Distributive Property: $c(\underline{u} + \underline{v}) = c\underline{u} + c\underline{v}$
8. : $1\underline{u} = \underline{u}$

   $0\underline{u} = \underline{0}$

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