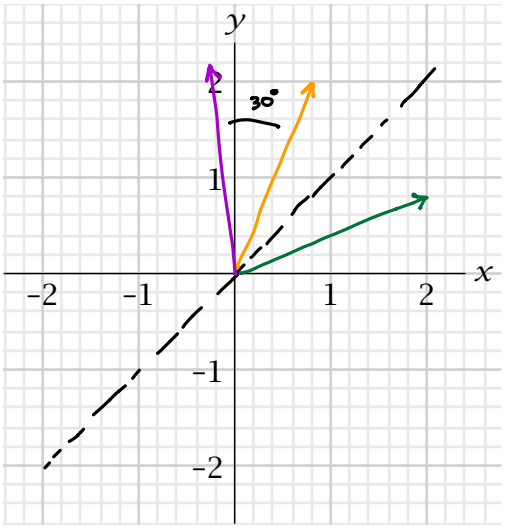
Physics 412—Commuting Operators **Winter 2020**

In quantum mechanics, operators may or may not commute. If the operators commute, then the order doesn't matter, and $AB|\Psi\rangle = BA|\Psi\rangle$. If they do not commute, then the order matters, and $AB|\Psi\rangle \neq BA|\Psi\rangle$

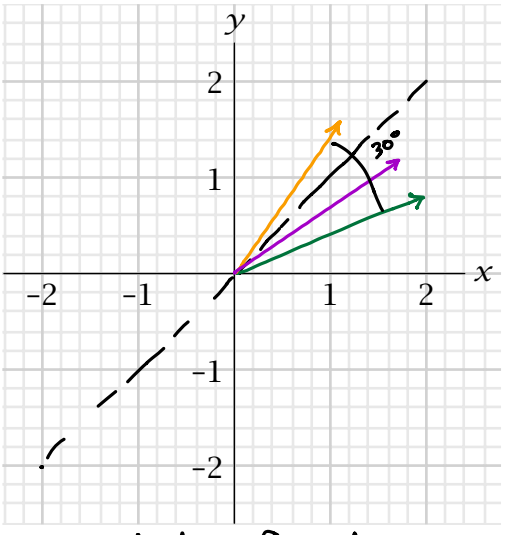
(1) Working graphically, determine whether R_{30} and T_{45} commute.

$R_{30}T_{45}\vec{A}$



reflect first, rotate second

$T_{45}R_{30}\vec{A}$



Rotate first, reflect second

R_{30} & T_{45} do not commute