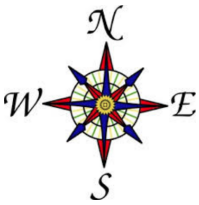
Exploration 3

Name_____



A "unit" vector is any vector whose length is *one* unit. Let **N** , **E**, **S**, **W**, **NE**, **SE**, **SW**, and **NW** be unit vectors in the indicated compass directions.

1. Express each of the above unit vectors in terms of components. For example $\mathbf{N} = \langle 0, 1 \rangle$.
2. We can use linear combinations of these unit vectors to calculate net displacements in these compass directions. For example, starting from the origin suppose we go 5 miles north then 2 miles south-west. The net displacement of our position from the origin is $5\mathbf{N} + 2\mathbf{SW}$. What are the components of this net displacement?

You go on a journey from your home (the origin of your coordinate system). Use displacement vectors in component form to track your journey from home.

3. Where do you end up (what are your coordinates within your coordinate system) after travelling 2 miles east then 1 mine north-east?
4. From your previous location, you then travel 3 miles north-west. Where are you now?
5. You then continue one mile south. Now where are you?
6. Finally, you go 5 miles south-west. What are the coordinates of your final destination?