Lesson 7: Sequencing Translations

Classwork

Exploratory Challenge

1. 
	1. Translate $∠ABC$ and segment $ED $along vector $\vec{FG}. $ Label the translated images appropriately, i.e., $A'B'C' $and $E'D'$.
	2. Translate $∠A'B'C'$ and segment $E'D' $along vector $\vec{HI}.$ Label the translated images appropriately, i.e., $A''B''C''$ and $E''D''.$
	3. How does the size of $∠ABC$ compare to the size of $∠A''B''C''$?
	4. How does the length of segment $ED$ compare to the length of the segment $E''D''$?
	5. Why do you think what you observed in parts (d) and (e) were true?
2. Translate $△ABC$ along vector $\vec{FG}$ and then translate its image along vector $\vec{JK}$. Be sure to label the images appropriately.



1. Translate figure $ABCDEF$ along vector $\vec{GH}$. Then translate its image along vector $\vec{JI}$. Label each image appropriately.

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* 1. Translate Circle $A$ and Ellipse $E$ along vector $\vec{AB}$. Label the images appropriately.
	2. Translate Circle $A'$ and Ellipse $E'$ along vector $\vec{CD}$. Label each image appropriately.
	3. Did the size or shape of either figure change after performing the sequence of translations? Explain.
1. The picture below shows the translation of Circle $A$ along vector $\vec{CD}$. Name the vector that will map the image of Circle *A* back to its original position.
2. If a figure is translated along vector $\vec{QR}$, what translation takes the figure back to its original location?

Lesson Summary

* Translating a figure along one vector then translating its image along another vector is an example of a sequence of transformations.
* A sequence of translations enjoys the same properties as a single translation. Specifically, the figures’ lengths and degrees of angles are preserved.
* If a figure undergoes two transformations, $F $and $G$, and is in the same place it was originally, then the figure has been mapped onto itself.

Problem Set

1. Sequence translations of parallelogram $ABCD$ (a quadrilateral in which both pairs of opposite sides are parallel) along vectors $\vec{HG}$ and $\vec{FE}$. Label the translated images.



1. What do you know about $AD$ and $BC$ compared with $A'D'$ and $B'C'$? Explain.
2. Are $A'B'$ and $A''B''$ equal in length? How do you know?
3. Translate the curved shape $ABC$ along the given vector. Label the image.



1. What vector would map the shape $A'B'C' $back onto$ABC$*?*