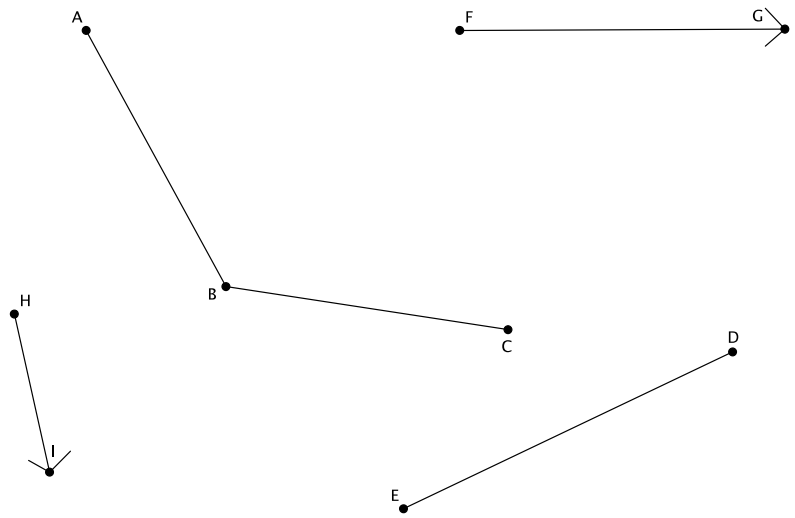
Lesson 7: Sequencing Translations

Classwork

Exploratory Challenge

1.



a. Translate $\angle ABC$ and segment ED along vector $\overrightarrow{FG}$. Label the translated images appropriately, i.e., $A'B'C'$ and $E'D'$.

b. Translate $\angle A'B'C'$ and segment $E'D'$ along vector $\overrightarrow{HI}$. Label the translated images appropriately, i.e., $A''B''C''$ and $E''D''$.

c. How does the size of $\angle ABC$ compare to the size of $\angle A''B''C''$?

d. How does the length of segment ED compare to the length of the segment $E''D''$?

e. Why do you think what you observed in parts (d) and (e) were true?

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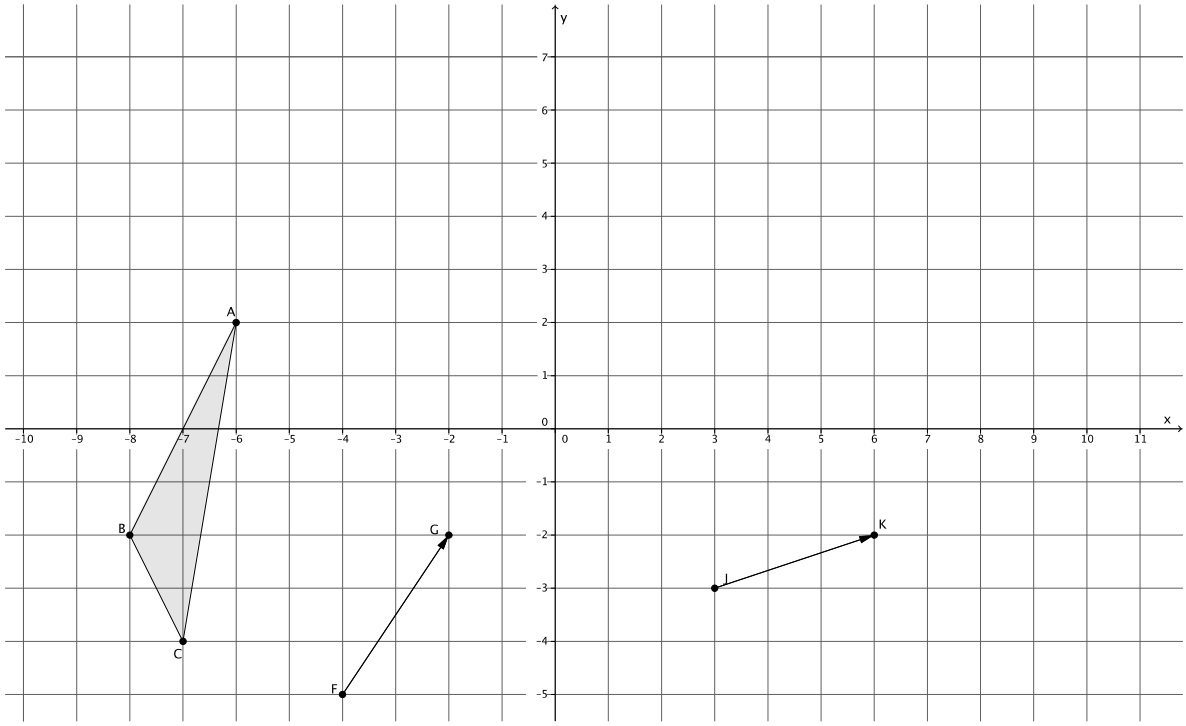
2. Translate ΔABC along vector $\overrightarrow{FG}$ and then translate its image along vector $\overrightarrow{JK}$. Be sure to label the images appropriately.



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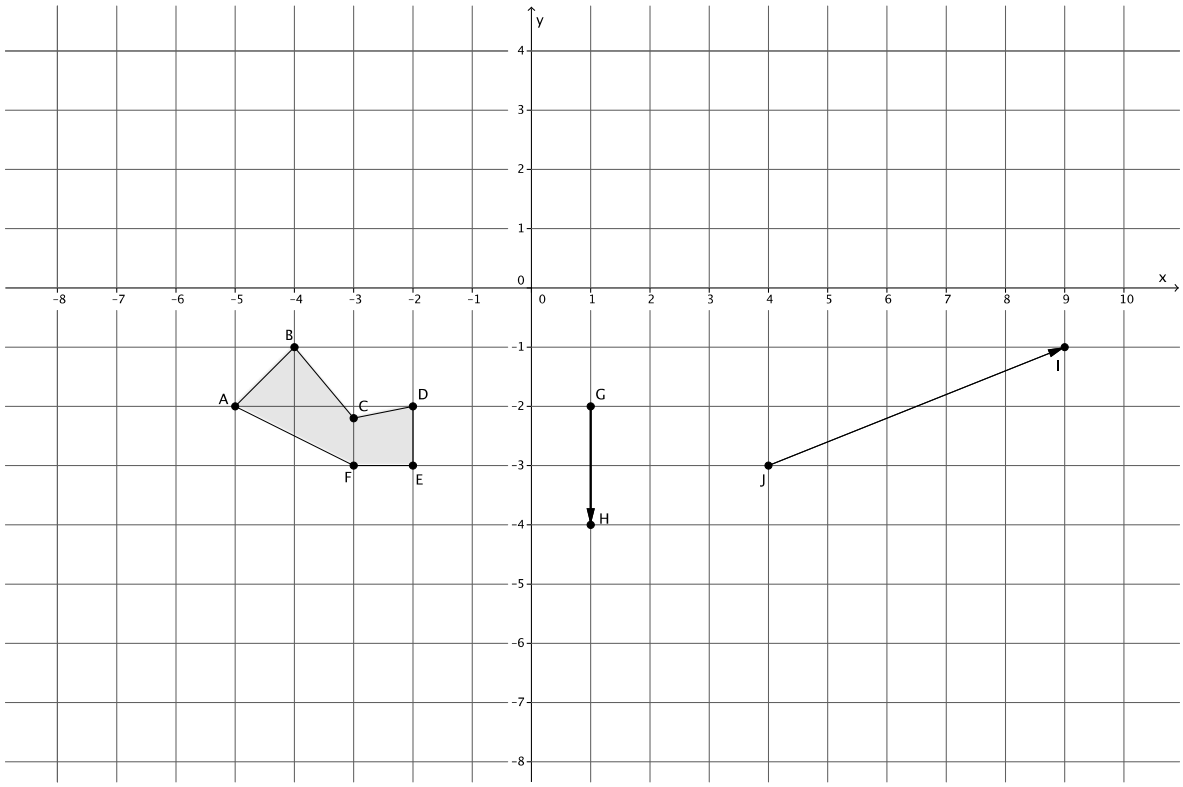
3. Translate figure $ABCDEF$ along vector $\overrightarrow{GH}$. Then translate its image along vector $\overrightarrow{JI}$. Label each image appropriately.



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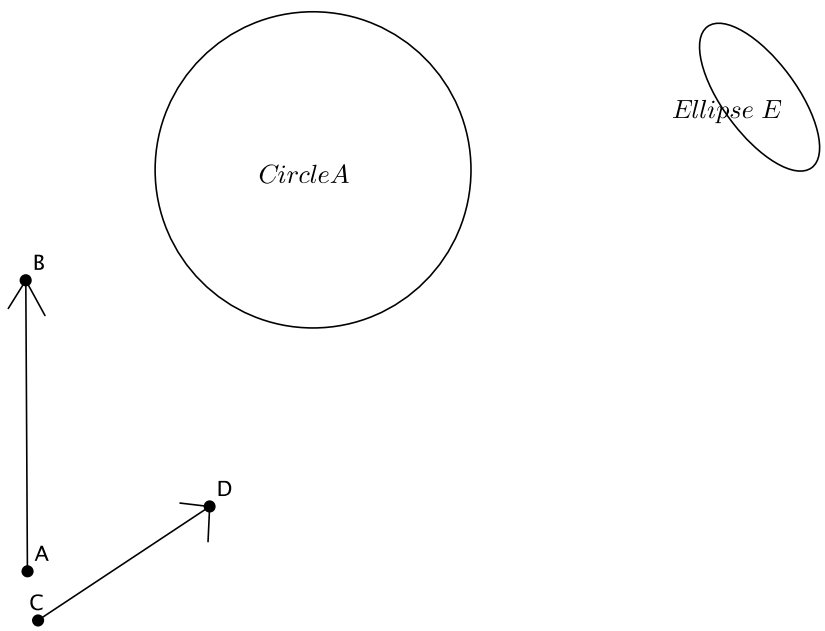
4.



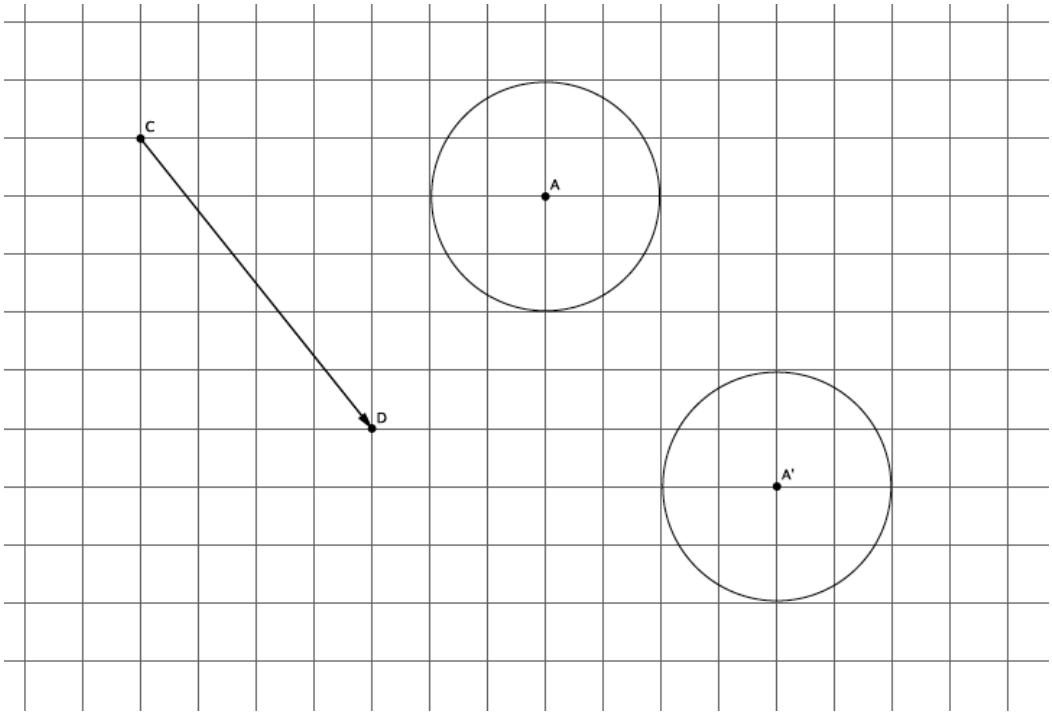
a. Translate Circle A and Ellipse E along vector $\overrightarrow{AB}$. Label the images appropriately.

b. Translate Circle A' and Ellipse E' along vector $\overrightarrow{CD}$. Label each image appropriately.

c. Did the size or shape of either figure change after performing the sequence of translations? Explain.

[Type here]

5. The picture below shows the translation of Circle *A* along vector $\overrightarrow{CD}$. Name the vector that will map the image of Circle *A* back onto itself.



6. If a figure is translated along vector $\overrightarrow{QR}$, what translation takes the figure back to its original location?

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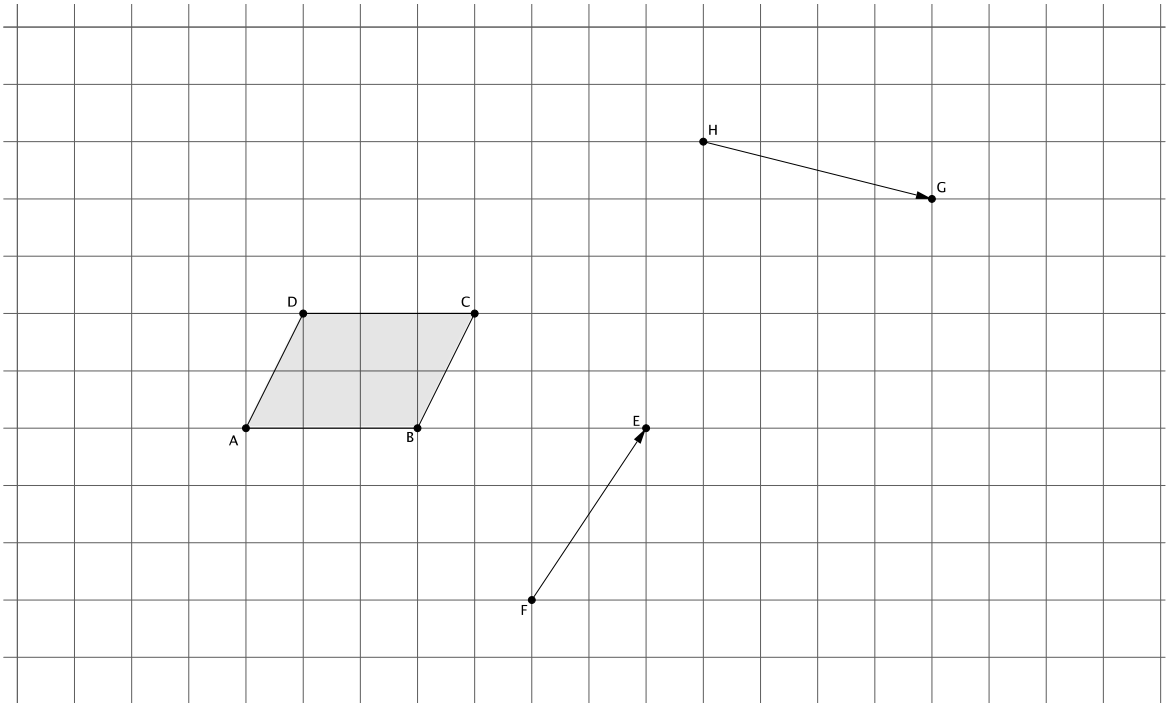
Lesson Summary

- 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 $\overrightarrow{HG}$ and $\overrightarrow{FE}$. Label the translated images.



2. What do you know about AD and BC compared with $A'D'$ and $B'C'$? Explain.

3. Are $A'B'$ and $A''B''$ equal in length? How do you know?

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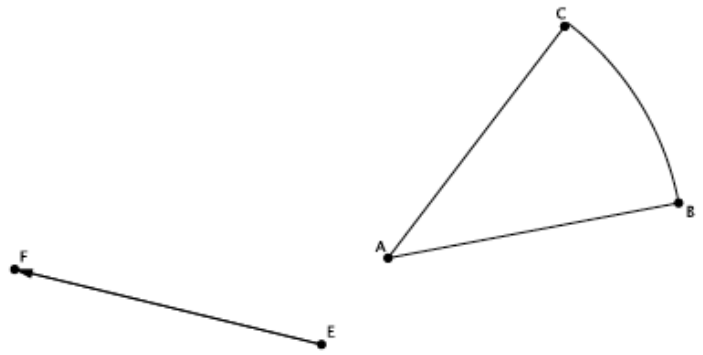
4. Translate the curved shape ABC along the given vector. Label the image.
5. What vector would map the shape $A'B'C'$ back onto ABC?



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