

VOCABULARY

- Vector
- Initial point
- Terminal point
- Horizontal component
- Vertical component
- Component form
- Transformation
- Image
- Preimage
- Translation
- Rigid motion
- Composition of transformations

LEARNING TARGETS

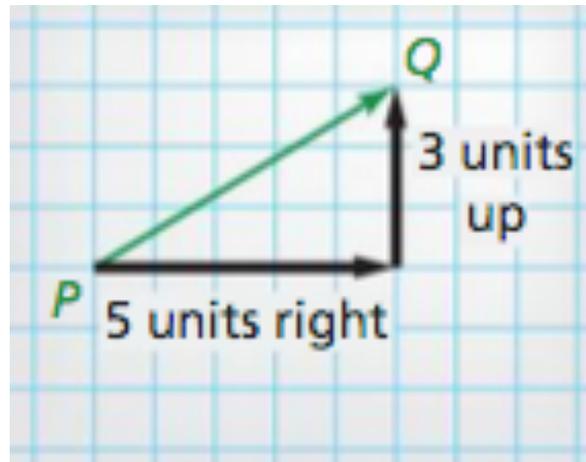
- I can perform translations
- I can perform compositions
- I can solve real-life problems involving compositions.

4.1 Translations

I can perform
translations.

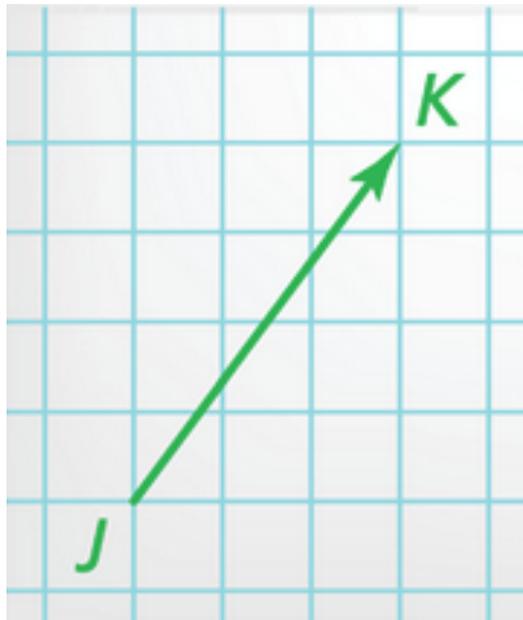
Vocabulary: Vector

- A **vector** is a quantity that has both direction and magnitude, or size, and is represented in the coordinate plane by an arrow drawn from one point to another.



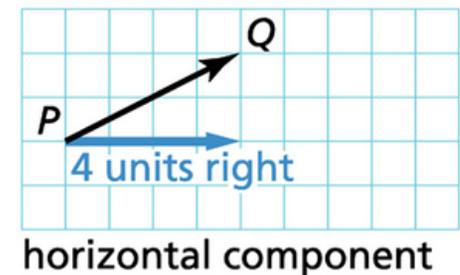
Vocabulary: Initial Point and Terminal Point

- The **initial point** is the starting point of a vector.
- The **terminal point** is the ending point of a vector.

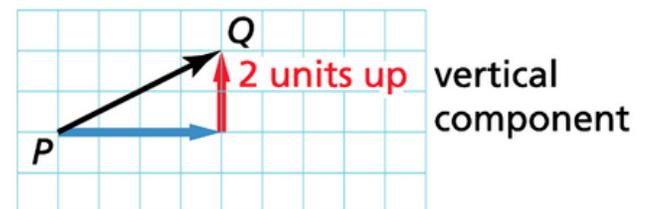


Vocabulary: Horizontal Component, Vertical Component, Component Form

- The **horizontal component** is the horizontal change from the starting point of a vector to the ending point.



- The **vertical component** is the vertical change from the starting point of a vector to the ending point.



- Component form** is a form of a vector that combines the horizontal and vertical components

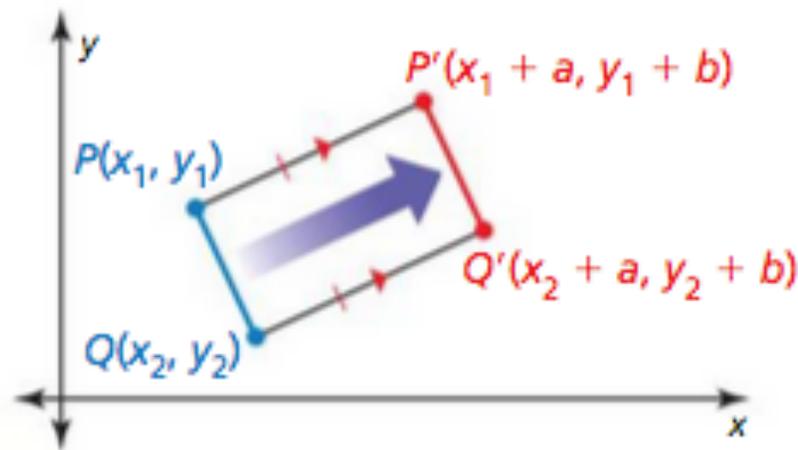
The component form of \overrightarrow{PQ} is $\langle 4, 2 \rangle$.

Vocabulary: Transformation, Preimage, Image

- A **transformation** is a function that moves or changes a figure in some way to produce a new figure called an **image**. Another name for the original figure is the **preimage**. The points on the preimage are the inputs for the transformation, and the points on the image are the outputs.

Vocabulary: Translation

- A **translation** moves every point of a figure the same distance in the same direction. More specifically, a translation maps, or moves, the points of a figure along a vector to new points.



- You can use prime notation to name an image. The preimage is “point P” and the image would be “point P prime”

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Vocabulary: Rigid Motion

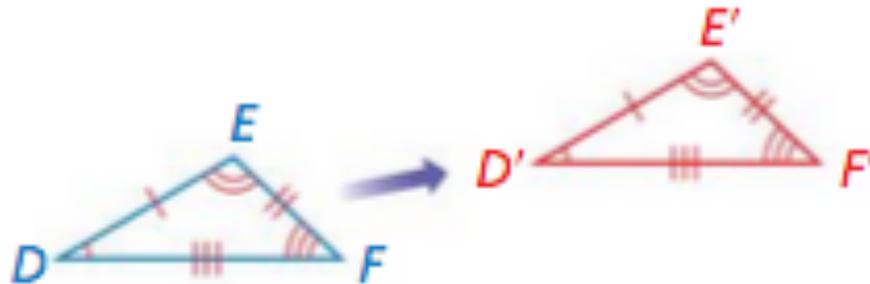
- A **rigid motion** is a transformation that preserves length and angle measure. Another name for a rigid motion is an *isometry*. A rigid motion maps lines to lines, rays to rays, and segments to segments.

Postulate 4.1 - Translation Postulate

- A **translation** is a rigid motion.

More on Rigid Motions

- Because a translation is a rigid motion and a rigid motion preserves length and angle measure, the following statements are true for the translation shown.



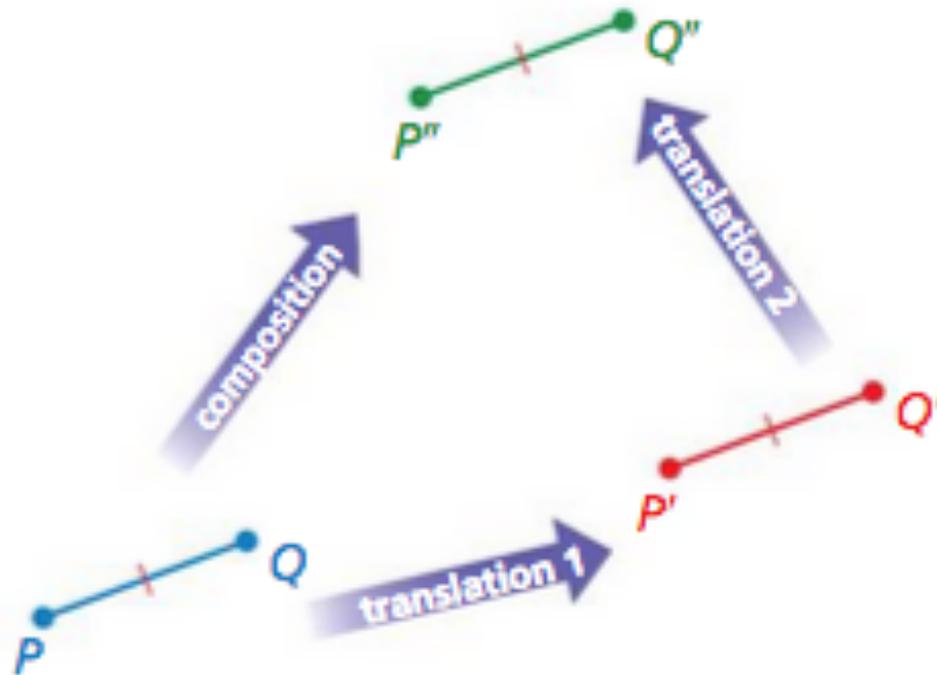
- $DE = D'E'$, $EF = E'F'$, $FD = F'D'$
- $m\angle D = m\angle D'$, $m\angle E = m\angle E'$, $m\angle F = m\angle F'$

Vocabulary: Composition of Transformations

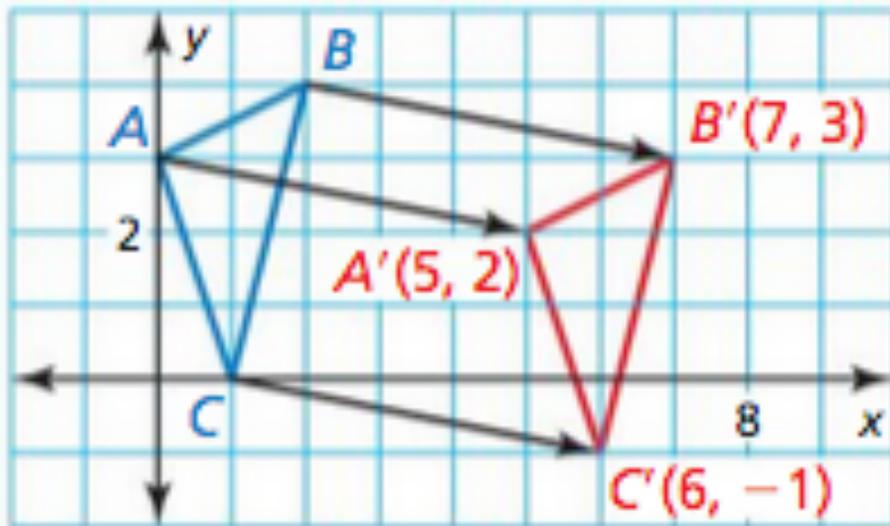
- When two or more transformations are combined to form a single transformation, the result is a **composition of transformations**.

Theorem 4.1 - Composition Theorem

- The composition of two (or more) rigid motions is a rigid motion.



- Important note: No matter how many rigid motions you perform, length and angle measures will be preserved in the final image.*



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