

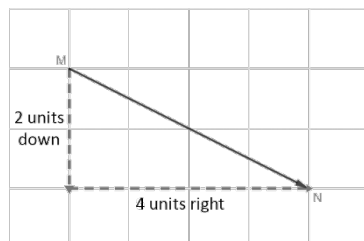
GUIDED NOTES (MODEL NOTES)

Vocabulary

- **transformation:** a function (rule) that changes the figure in some way.
- **translation:** a type of transformation where every point of a figure is moved the same distance in the same direction; the figure **slides** without rotating or flipping.
- **preimage:** the original figure, before any transformation(s); the input.
- **image:** the final figure; the result from applying the transformation(s); the output.
- **rigid motion:** a transformation where the image is congruent to the preimage; a translation is an example of rigid motion.

	<p>Verbal Description</p>
	<p>Translate the preimage 4 units right and 2 units down.</p>
	<p>Algebraic Rule</p>
	<p>$(x, y) \rightarrow (x + 4, y - 2)$</p>
<p>Mapping Notation</p>	
<p>$A \rightarrow A'$ Read: Point A maps to point A prime.</p>	<p>$Polygon\ ABCD \rightarrow Polygon\ A'B'C'D'$ Read: Polygon A, B, C, D maps to polygon A prime, B prime, C prime, D prime.</p>

- **vector:** a path, with a starting and ending point that a figure follows; it has size (magnitude/distance) and direction.
 - **example:** \overrightarrow{MN} , read “vector MN,” where M is the starting (initial) point and N is the ending (terminal) point



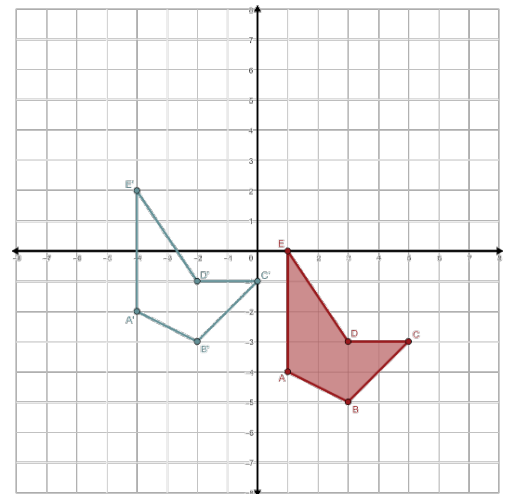
We can also represent \overrightarrow{MN} in its component form: $\langle 4, -2 \rangle$, where 4 is the horizontal component, and -2 is the vertical component.

Example Problems

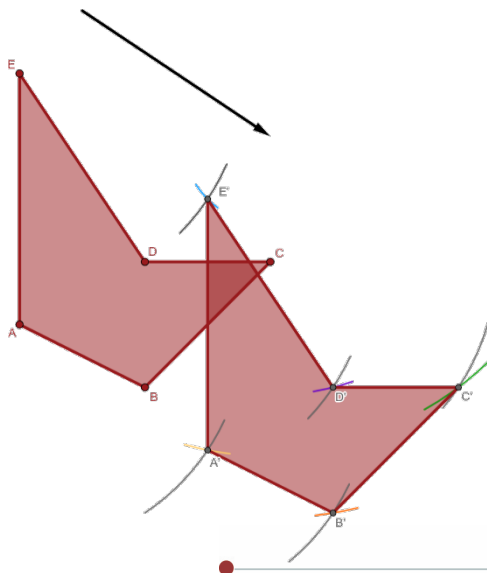
1) Complete the table below for the unshaded preimage and shaded image.

Graph	Verbal Description	Algebraic Rule	Vector Notation
	<p>Translate the preimage right 7 units and up 4 units.</p>	$(x, y) \rightarrow (x+7, y+4)$	$\langle 7, 4 \rangle$

2) Polygon $ABCDE$ has the following vertices: $A(1, -4)$, $B(3, -5)$, $C(5, -3)$, $D(3, -3)$, and $E(1, 1)$. Draw Polygon $ABCDE$, then translate Polygon $ABCDE$ using the vector $\langle -5, 2 \rangle$. Label Polygon $ABCDE$ and its image.



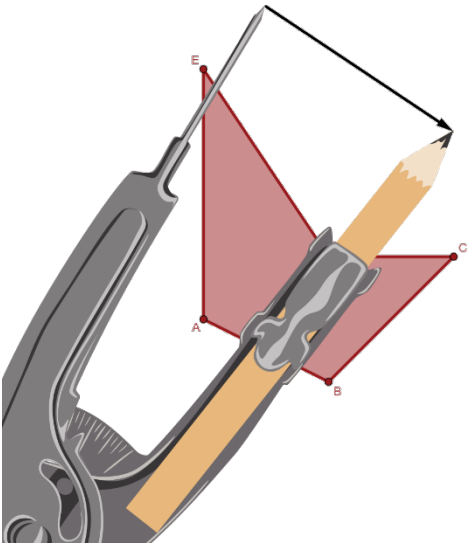
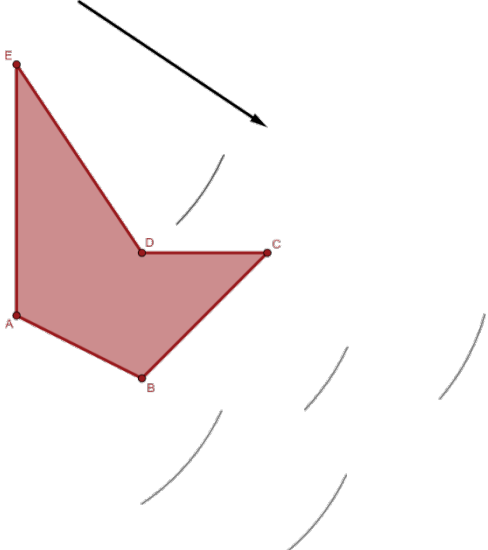
3) What if the preimage was not on the coordinate plane? How would we construct the image? Construct the image given the following preimage and vector.

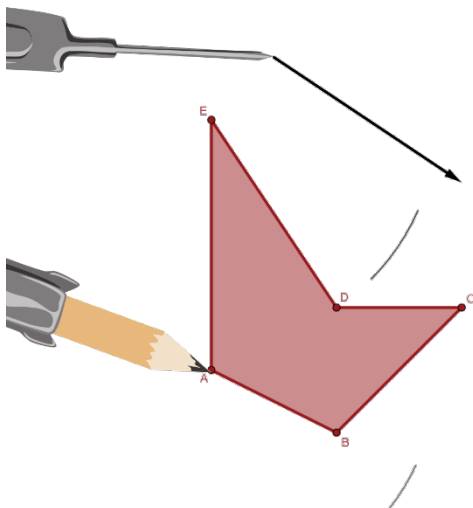
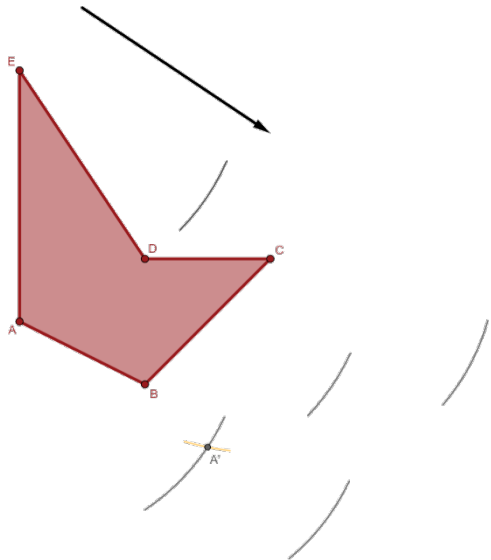


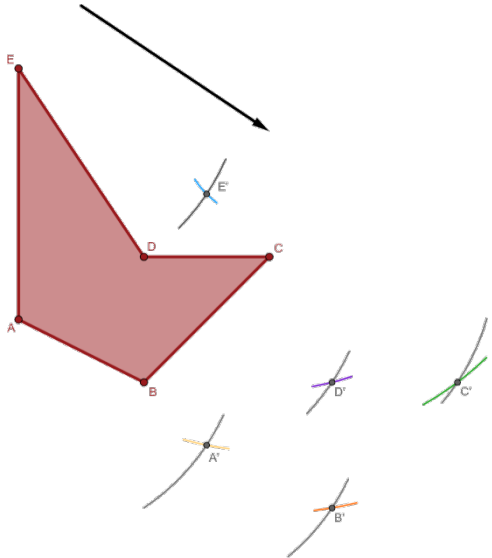
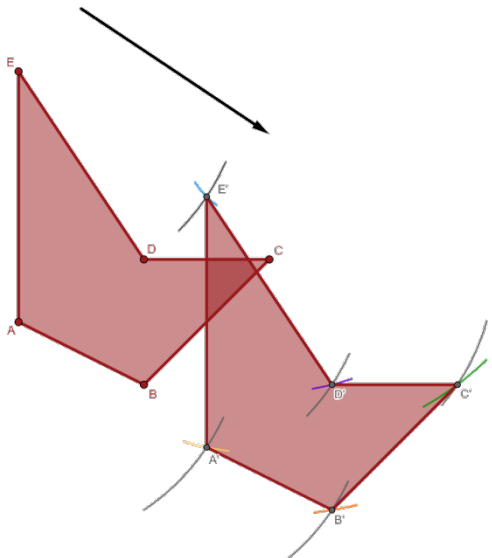
GUIDED NOTES (TEACHER GUIDE)

Example 3

How to construct a translation with a compass and straightedge.

Construction	Instruction
	<p>Step 1: Use the compass to measure the length of the vector.</p>
	<p>Step 2: Use that measurement as the radius to construct an arc for each point (in the general direction that the vector is pointing). <i>Consider labeling each arc to keep track of which one corresponds to which point.</i></p>

Construction	Instruction
	<p>Step 3: Use the compass to measure the distance between <i>Point A</i> and the initial end of the vector. This measurement tells us about the distance between <i>Point A'</i> and the terminal end of the vector.</p>
	<p>Step 4: Use this measurement to construct an arc with a center at the terminal end of the vector and intersects the initial corresponding arc from Step 2. Label that point of intersection A'.</p>

Construction	Instruction
	<p>Step 5: Repeat steps 3 and 4 for the remaining points.</p>
	<p>Step 6: Use a straightedge to create the polygon (image).</p>