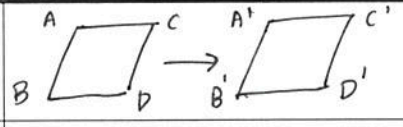
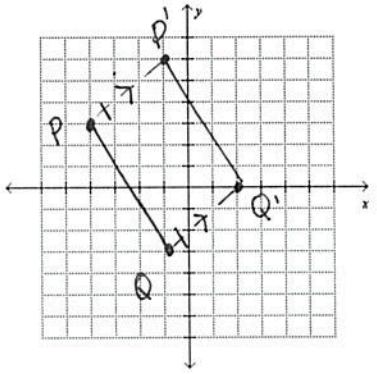
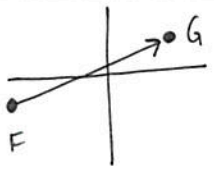
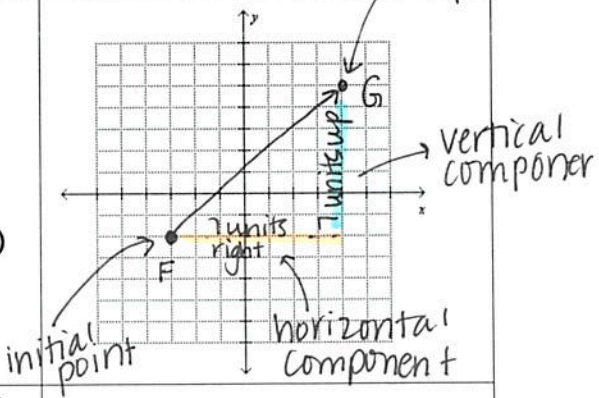
Section Summary: 9-1 Translate Figures & Use Vectors

Key

Term	Definition	Example
transformation	A transformation is a move or a change to a figure that produces a new figure called an image.	
image	The figure produced after transformation(s).	A'B'C'D' above
preimage	Another name for the original figure before any transformations.	ABCD above
prime notation	If the rule for transforming points in a figure ABC is $(x, y) \rightarrow (x+4, y-1)$, then A'B'C' is ABC with all points moved right 4 and down 1.	see image
translation	A translation moves every point of a figure the same distance in the same direction. PP' = QQ' and $\overline{PP'} \parallel \overline{QQ'}$ or PP' = QQ' and $\overline{PP'}$ and $\overline{QQ'}$ are collinear.	 $PP' \cong QQ'$ & $PP' \parallel QQ'$
isometry	An isometry is a transformation that preserves length and angle measure. Isometry is another word for congruence transformation.	
Theorem 9.1 Translation Theorem	**A translation is an isometry.**	
vector	A vector is a quantity that has both direction and magnitude (size). It is represented by an arrow drawn from one point to another in a plane.	
Vectors	1. **Initial Point- starting point of the vector** 2. **Terminal Point- ending point of the vector** 3. **Horizontal Component- the horizontal change (change in x)** 4. **Vertical Component- the vertical change (change in y)**	
component form	The component form of a vector combines the horizontal and vertical components. Example: $\langle 2, -3 \rangle$ move right 2, move down 3	$\overrightarrow{FG}$ $\langle 7, 7 \rangle$

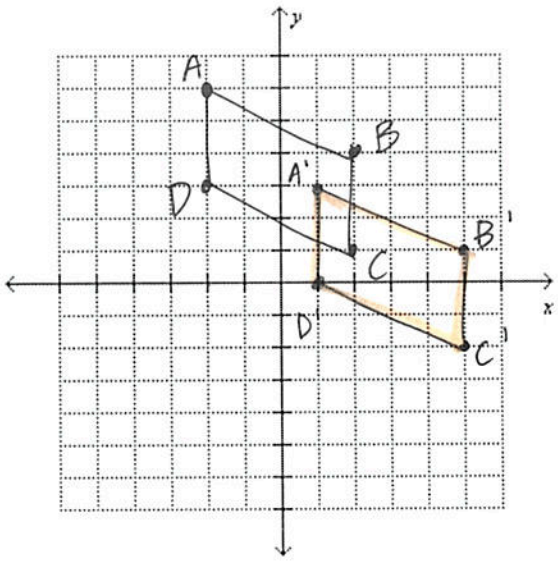
1. Graph quadrilateral ABCD with vertices A(-2,6), B(2,4), C(2,1), and D(-2,3).
Find the image of each vertex after the translation (x,y) → (x+3 , y-3).
Then, graph the image using prime notation.

$A' = (-2+3, 6-3) = (1, 3)$

$B' = (2+3, 4-3) = (5, 1)$

$C' = (2+3, 1-3) = (5, -2)$

$D' = (-2+3, 3-3) = (1, 0)$



2. Use the translation $(x, y) \rightarrow (x-5,\ y+2)$

a) What is the image of A(1, 5) ?

$A'(1-5, 5+2) = A'(-4, 7)$

b) What is the preimage of C'(3, - 4) ?

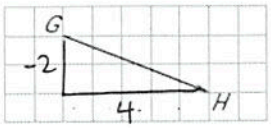
$x-5=3$ $\quad y+2=-4$

$x=8$ $\quad y=-6$

$C(8, -6)$

3. Name the vector and write it's component form.

a)



name: $\overrightarrow{GH}$

component form: $\langle 4, -2 \rangle$

4. The vertices of ΔABC are A(0,4), B(2,3) and C(1,0). Translate ΔABC using the vector $\langle -4, 1 \rangle$.

left 4, up 1