Honors Geometry

Notes Section 9.1

Translate Figures and Use Vectors

VOCABULARY

Image: new figure resulting from a transformation

Preimage: original figure prior to transformation

Isometry: a transformation that preserves length and angle measure.

Vector: a quantity that has both direction and magnitude (size); _____

Initial Point: starting point of a vector

Terminal Point: ending point of a vector

Component Form: ⟨horizontal component, vertical component⟩

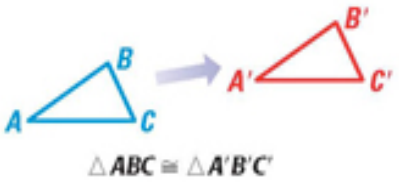
Horizontal Component: x - coordinate direction

Vertical Component: y - coordinate direction

Translation: a transformation that moves ever point of a figure the same distance in the same direction.

THEOREM 9.1 Translation Theorem

A translation is an isometry.



EXAMPLE 1 Graph quadrilateral ABCD with vertices A(-1,2), B(-1,5), C(4,6), and D(4,2). Find the image of each vertex after the translation $(x,y) \rightarrow (x + 3, y - 1)$. Then graph the image using prime notation.

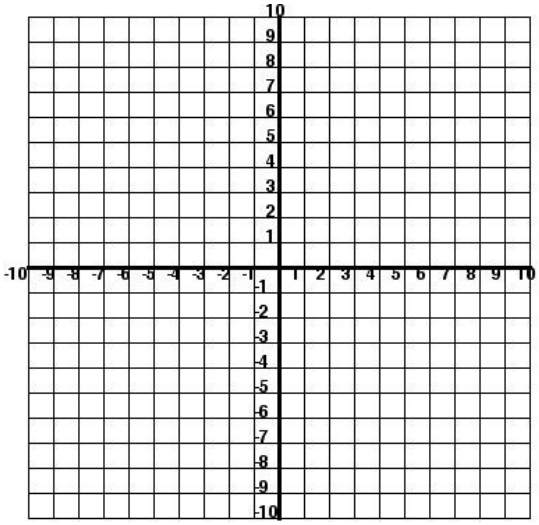
$(x,y) \rightarrow (x + 3, y - 1)$

A (-1,2) → _____

B(-1,5) → _____

C(4,6) → _____

D(4,2) → _____



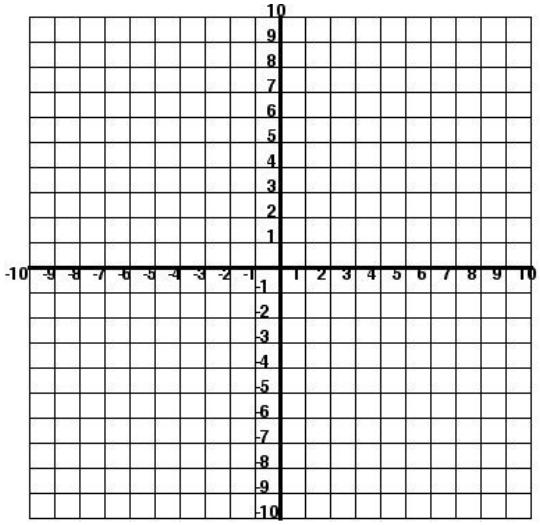
EXAMPLE 2 Write a rule for the translation of ΔABC to ΔA'B'C'. Then verify that the transformation is an isometry.

A(4,3) → _____

B(7,1) → _____

C(4,1) → _____

Rule: (x,y) → _____



EXAMPLE 3 Name the vector and write its component form.

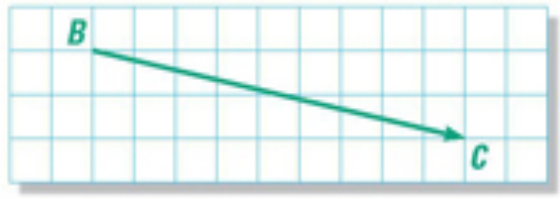
a) _____

_____

b) _____

_____

a.



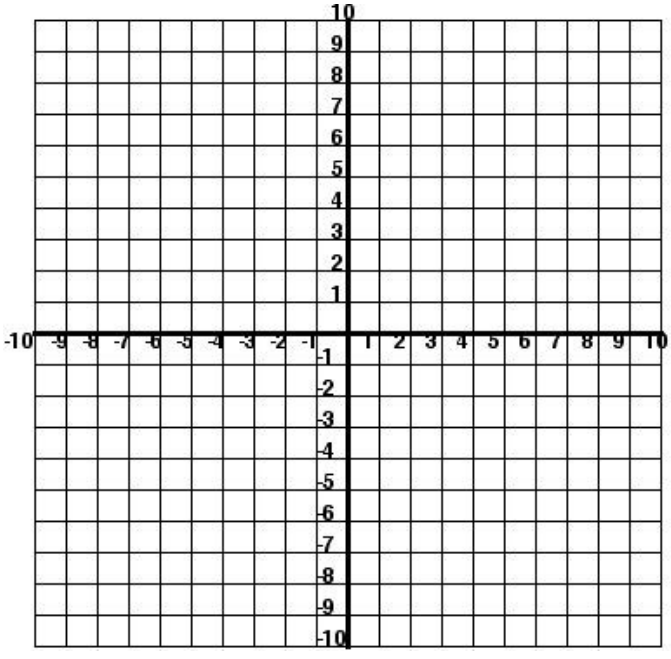
b.

EXAMPLE 4 The vertices of ΔABC are A(0,3), B(2,4) and C(1,0). Translate ΔABC using the vector ⟨5, -1⟩.

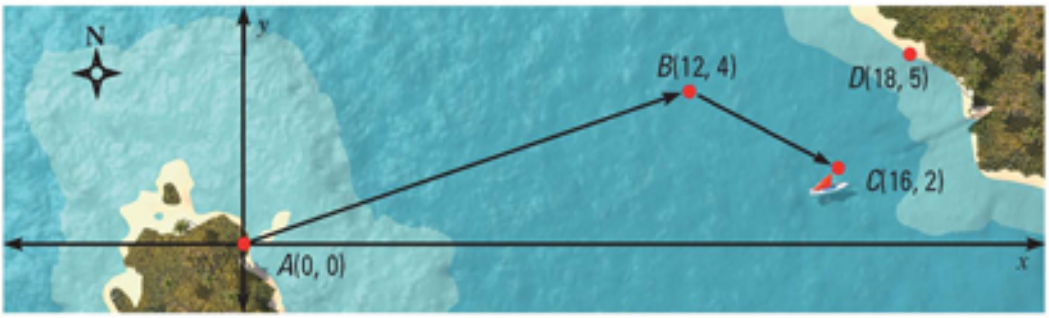
A(0,3) → _____

B(2,4) → _____

C(1,0) → _____



EXAMPLE 5 A boat heads out from point A on one island toward point D on another. The boat encounters a storm at B, 12 miles east and 4 miles north of its starting point. The storm pushes the boat off course to point C, as shown.



a) Write the component form of vector AB.

b) Write the component form of vector BC.

c) Write the component form of the vector that describes the straight line path from the boat's current position C to its intended destination D.