

# Geometry Unit 7: Congruence transformations

Bronx Early College Academy

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17 January 2023 - 3 February 2023

7.1 Translation

17 January

7.2 Reflection

18 January

7.3 Rotation

20 January

7.4 Rotation

23 January

# Learning Target: I can slide a figure

HSG.CO.A.5 Congruence transformations

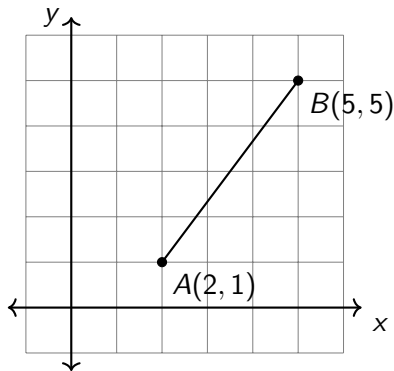
7.1 Tuesday 17 January

Do Now

1. Review your Jumprope grades
2. Find the rise and run of the line segment  $\overline{AB}$ .

Lesson: Translation, classwork practice

Homework: Complete the classwork practice



# Translation

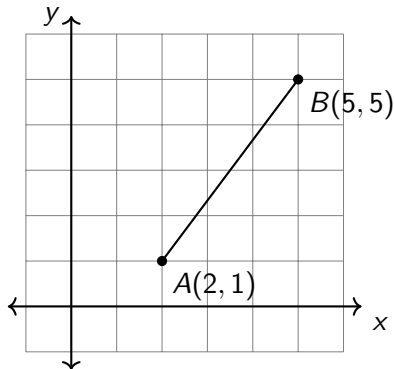
Rise is plus 4, run is plus 3.

$$A(2, 1) \rightarrow B(5, 5)$$

**Translate** Move a figure horizontally and vertically (slide)

**Vector** A quantity with both magnitude and direction

$$\overrightarrow{AB} = (3, 4)$$



## Example: Translate point $A$ up two units and right four units

Notation for translation:

$$\overrightarrow{AA'} = (+4, +2)$$

$$A(1, 2) \rightarrow A'(1 + 4, 2 + 2)$$

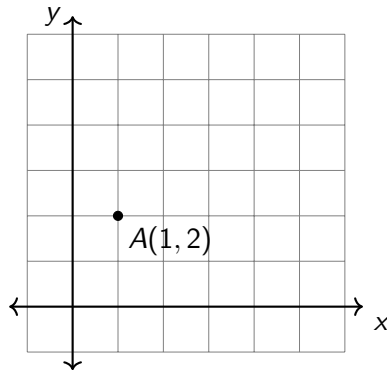
$$T_{+4, +2}$$

**Pre-image** The original figure

**Image** The result of a transformation

→ We say the  $A$  is *mapped* to  $A'$ .

**Prime** The prime symbol is used to denote the image ( $A'$ )



Translate  $\triangle ABC$  right one unit and up three units  $T_{+1,+3}$

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

$$A(1, 1) \rightarrow$$

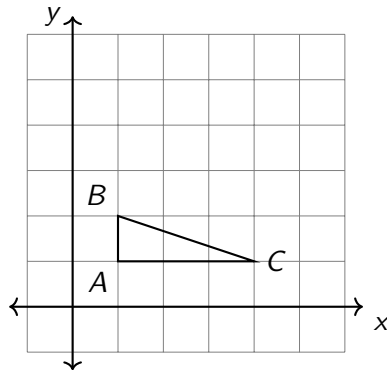
$$B(1, 2) \rightarrow$$

$$C(4, 1) \rightarrow$$

**Rigid motion** Move without changing the shape or size (isometry)

**Congruent** Figures with the same size and shape

**Invariant** Does not change (lengths, angles, area, perimeter)



# Learning Target: I can reflect a figure

HSG.CO.A.5 Congruence transformations

7.2 Wednesday 18 January

Do Now: Find the lengths of the sides of  $\triangle ABC$ .

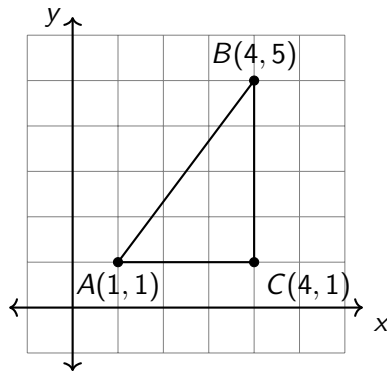
$AC =$

$BC =$

$AB =$

Lesson: Reflection, classwork practice

Homework: Complete classwork, Deltamath assignment



# Reflect or flip an object across the $y$ -axis

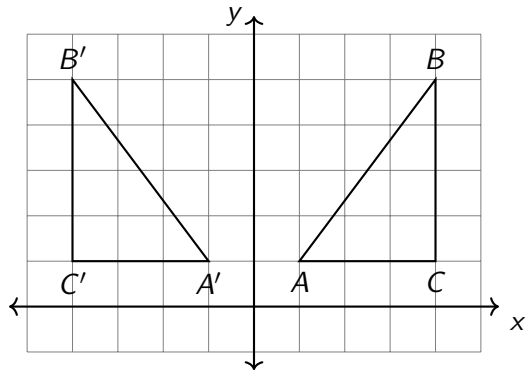
Reflection is a rigid motion.

$$\triangle ABC \rightarrow \triangle A'B'C'$$

**Reflection** A transformation that flips an object across a line

**Line of reflection** The line across which the object is flipped

**Correspond** Parts that map to each other  
 $A$  corresponds to  $A'$ .





# Learning Target: I can rotate a figure

HSG.CO.A.5 Congruence transformations

7.3 Friday 20 January

Do Now: Find the angle measures of right  $\triangle ABC$ .

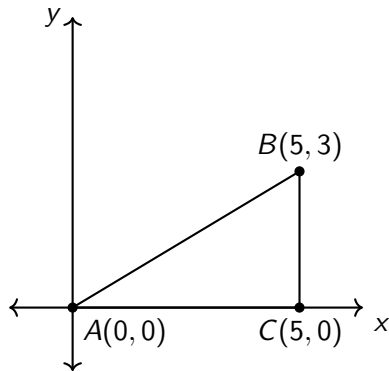
$$m\angle A = 30^\circ$$

$$m\angle B =$$

$$m\angle C =$$

Lesson: Rotation, classwork practice

Homework: Complete classwork, Deltamath assignment



# Learning Target: I can employ multiple rigid motions

HSG.CO.A.5 Congruence transformations

7.4 Friday 20 January

Do Now: Rotate  $\triangle ABC$  counterclockwise  $90^\circ$  around the origin.

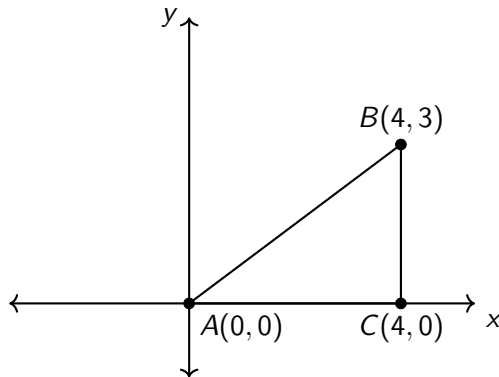
$A(0, 0) \rightarrow$

$B(4, 3) \rightarrow$

$C(4, 0) \rightarrow$

Lesson: Composition of transformations,  
mixed practice

Homework: Complete classwork, Deltamath  
assignment



## Learning Target: I can employ multiple rigid motions

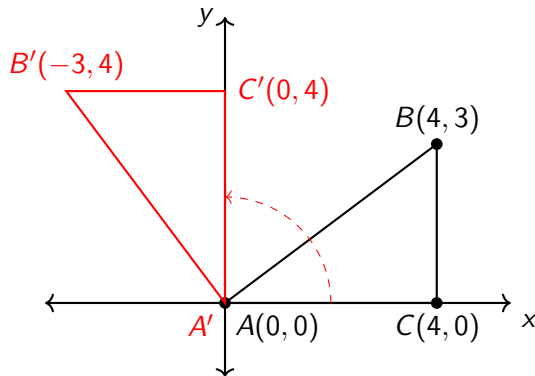
Solution: Rotate  $\triangle ABC$  counterclockwise  $90^\circ$  around the origin.

$$A(0,0) \rightarrow A'(0,0)$$

$$B(4,3) \rightarrow B'(-3,4)$$

$$C(4,0) \rightarrow C'(0,4)$$

Check for understanding: What is the measure of angle  $\angle CAC'$ ?



## A *composition* is multiple transformations, one after the other

Example: Translate  $\triangle ABC$  to the right 5 units then reflect it over the  $x$ -axis.

$T_{+5,0}$        $reflect_{x-axis}$

$$A(-1, 2) \rightarrow A'(4, 2) \rightarrow A'(4, -2)$$

$$B(-4, 3) \rightarrow B'(1, 3) \rightarrow B'(1, -3)$$

$$C(-4, 2) \rightarrow C'(1, 2) \rightarrow C'(1, -2)$$

