Geometry Unit 7: Congruence transformations

Bronx Early College Academy

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17 January 2023 - 10 February 2023

7.1 Translation	17 January
7.2 Reflection	18 January
7.3 Rotation	20 January
7.4 Composition	23 January
7.5 Composition review	1 February
7.6 Using technology for transformations	3 February
7.7 Transformations “onto,” symmetry	6 February

Learning Target: I can slide a figure

HSG.CO.A.5 Congruence transformations

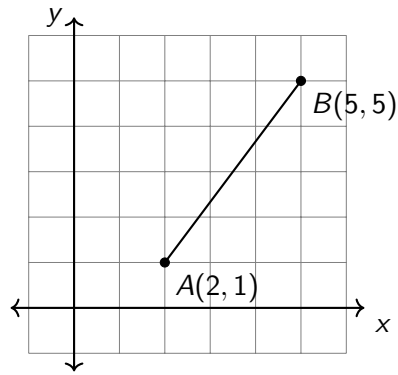
7.1 Tuesday 17 January

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

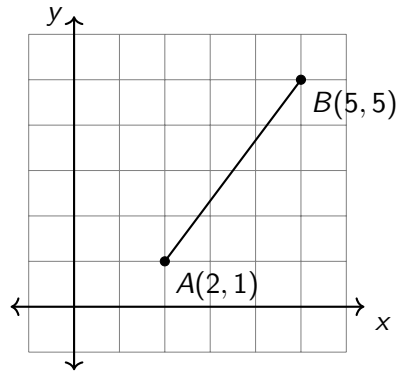
Rise is plus 4, run is plus 3.

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

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:

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

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

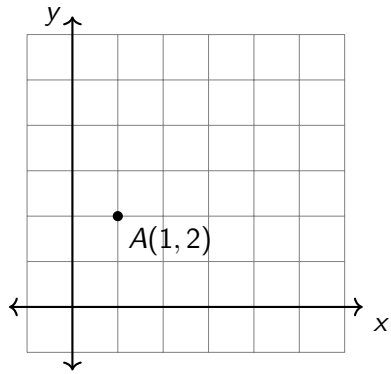
$$T_{+4,+2}$$

Pre-image The original figure

Image The result of a transformation

$\rightarrow$ 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 $T_{+1,+3}$

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

$$A(1, 1) \to$$

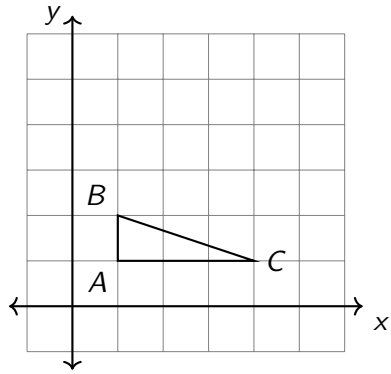
$$B(1, 2) \to$$

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

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 $\triangle ABC$.

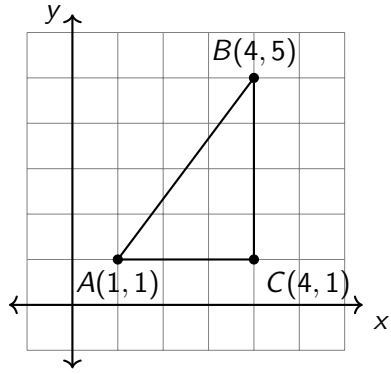
$AC =$

$BC =$

$AB =$

Lesson: Reflection, classwork practice

Homework: Complete classwork, Deltamath assignment



Reflect or flip an object across the y-axis

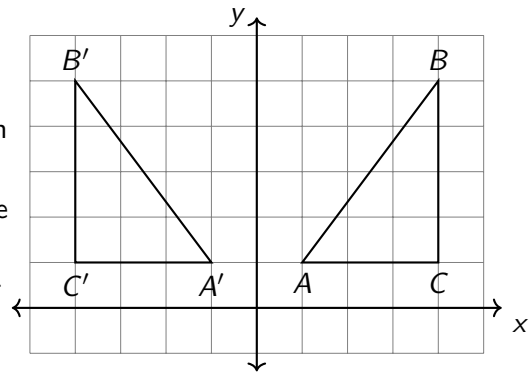
Reflection is a rigid motion.

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

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'.



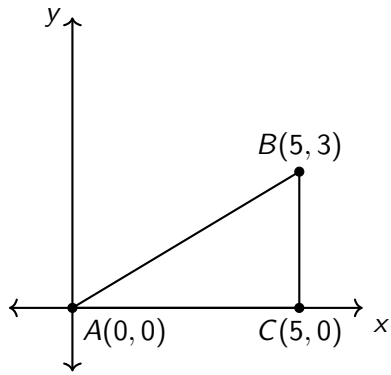
Learning Target: I can rotate a figure

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 Monday 23 January

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

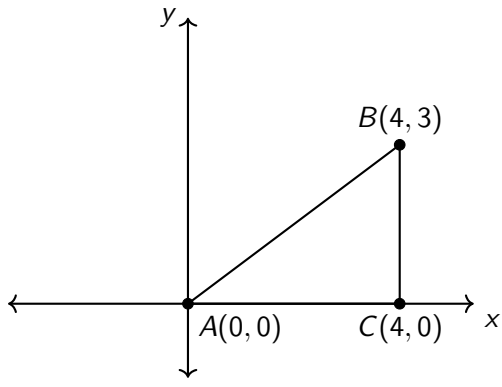
$A(0,0) \rightarrow$

$B(4,3) \rightarrow$

$C(4,0) \rightarrow$

Lesson: Composition of transformations, mixed practice

Homework: Complete classwork, Deltamath assignment



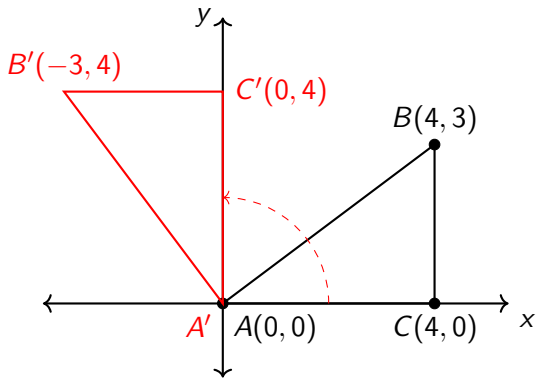
Solution: Rotate $\triangle ABC$ counterclockwise 90° around the origin.

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

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

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

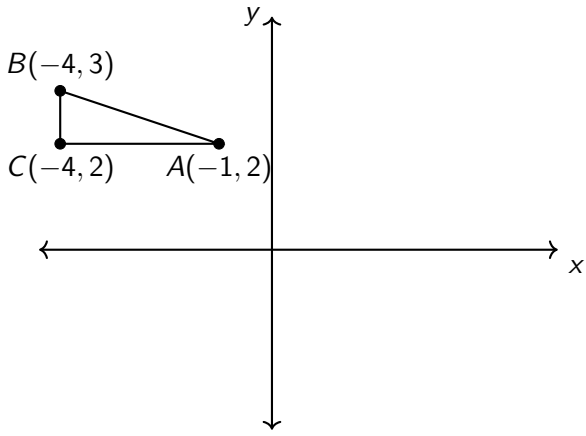
Check for understanding: What is the measure of angle $\angle CAC'$?



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.

$T_{+5,0}$	$reflect_{x-axis}$
$A(-1,2) \rightarrow$	
$B(-4,3) \rightarrow$	
$C(-4,2) \rightarrow$	



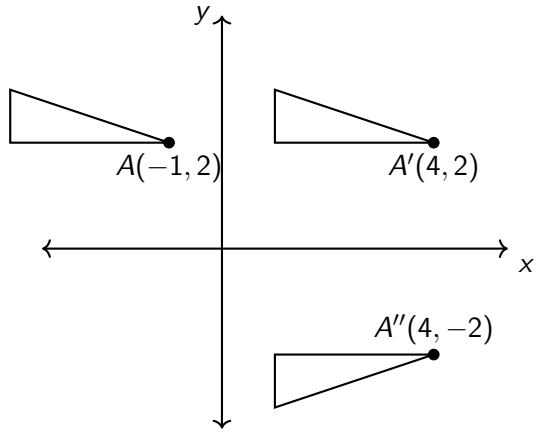
Translate $\triangle ABC$ to the right 5 units then reflect it over the x-axis.

$T_{+5,0}$ $reflect_{x-axis}$

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

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

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



Learning Target: I can employ multiple rigid motions

HSG.CO.A.5 Congruence transformations 7.5 Wednesday 1 February

Do Now: Slide $\triangle ABC$ to the left three and up two.

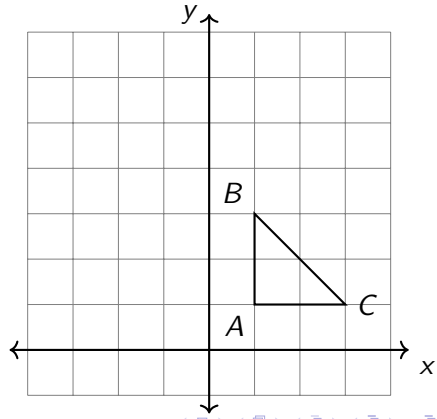
$A(1,1) \rightarrow$

$B(1,3) \rightarrow$

$C(3,1) \rightarrow$

Lesson: Composition of transformations, mixed practice

Homework: Complete classwork, Deltamath assignment

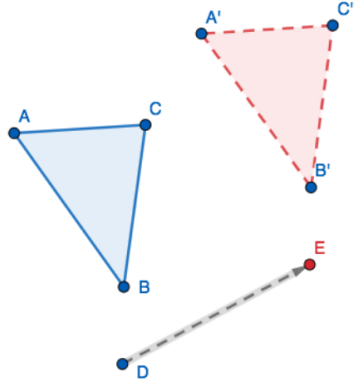


Learning Target: I can record a transformation using geogebra

HSG.CO.A.5 Congruence transformations 7.6 Friday 3 February

Do Now: Open the attached slide document and edit your name

Lesson: Use geogebra to perform a translation, reflection, and rotation



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

Translation by vector $\overrightarrow{DE}$

Learning Target: I can recognize symmetry

HSG.CO.A.5 Congruence transformations 7.7 Monday 6 February

Do Now: Reflect the $\triangle$ across the y-axis.

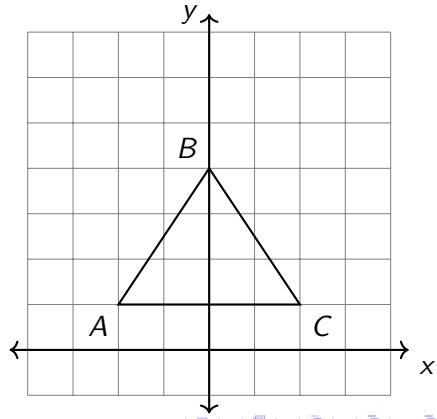
$A(-2, 1) \rightarrow$

$B(0, 4) \rightarrow$

$C(2, 1) \rightarrow$

Lesson: Transformations "onto," symmetry

Homework: Complete classwork, Deltamath assignment

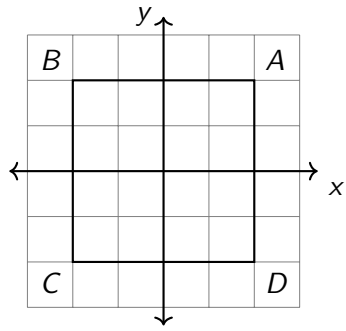


Learning Target: I can recognize symmetry

Rotate the square 90° counterclockwise around its center.

onto When the image of a figure is congruent to the original figure

symmetry When a figure is invariant under a transformation

bilateral symmetry When a figure is the same after a reflection across its mid-line

radial symmetry A shape is the same after a rotation around its center