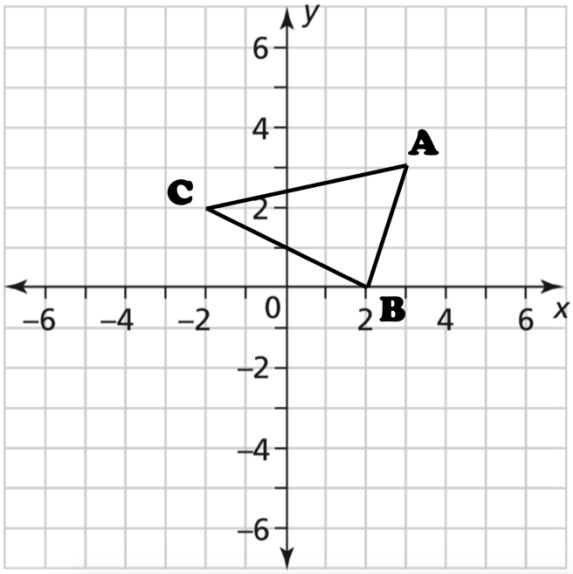
Name Key Block _____ Date _____

Transformations and Congruence

We will be using Δ ABC as our Preimage for all of the following problems.

1. Using the Pythagorean Theorem, calculate the lengths of each side of Δ ABC. Round your answers to the nearest tenth.
Show work below.



AB = 3.2 u. $1^2 + 3^2 = c^2$, $1 + 9 = c^2$, $10 = c^2$, $\sqrt{10} = c$

BC = 4.5 u. $2^2 + 4^2 = c^2$, $4 + 16 = c^2$, $20 = c^2$, $\sqrt{20} = c$

AC = 5.1 u. $1^2 + 5^2 = c^2$, $1 + 29 = c^2$, $26 = c^2$, $\sqrt{26} = c$

AB = 3.2 units BC = 4.5 units AC = 5.1 units

2. Calculate the slope for each side of Δ ABC.

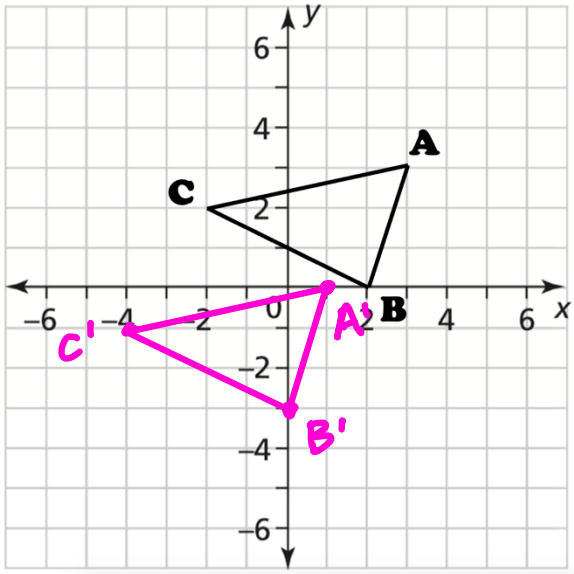
Slope AB = $3/1 = 3$

Slope BC = $-2/4 = -\frac{1}{2}$

Slope AC = $1/5$

For each of the following questions, graph the transformation and then answer the questions.

3. **Translate** Δ ABC following the rule $(x, y) \rightarrow (x - 2, y - 3)$



Using the Pythagorean Theorem, calculate the length of side A'B'. Round your answer to the nearest tenth.

$a^2 + b^2 = c^2$

$1^2 + 3^2 = c^2$

$10 = c^2$

$\sqrt{10} = c$

$\overline{A'B'} = 3.2$ units

Calculate the slope for each side of Δ A'B'C'.

Slope A'B'= $3/1 = 3$

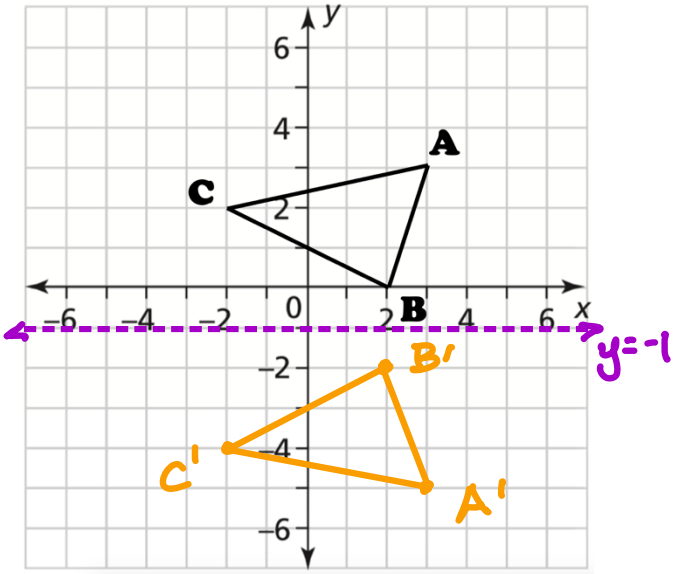
Slope B'C' = $-3/4 = -\frac{1}{2}$

Slope A'C' = $1/5$

How do the length of A'B' and the slopes of the sides compare to those of Δ ABC'?

- The length of A'B' is the same as the length of AB.
- The slopes of the sides of $\Delta A'B'C'$ are equal to the slopes of the corresponding sides of ΔABC.

4. **Reflect** Δ ABC across the line $y = -1$.



Using the Pythagorean Theorem, calculate the length of side A'B'. Round your answer to the nearest tenth.

$a^2 + b^2 = c^2$

$1^2 + 3^2 = c^2$

$1 + 9 = c^2$

$10 = c^2$

$\sqrt{10} = c$

$\overline{A'B'} = 3.2$ units

Calculate the slope for each side of Δ A'B'C'.

Slope A'B'= $-3/1$

Slope B'C' = $2/4$

Slope A'C' = $-1/5$

How do the length of A'B' and the slopes of the sides compare to those of Δ ABC'?

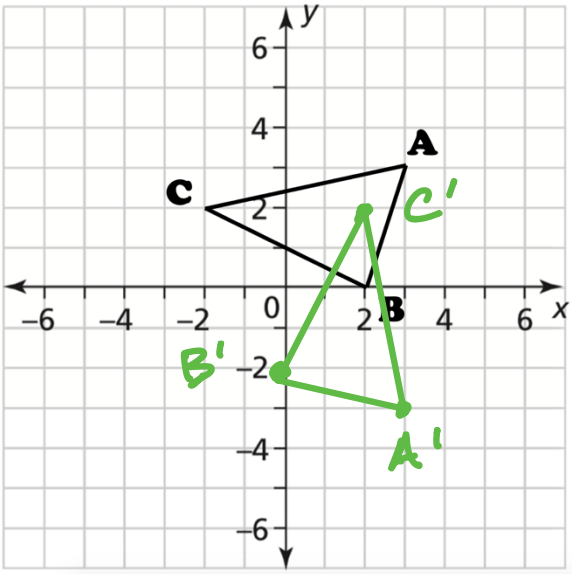
- The length of A'B' is the same as the length of AB.
- The slopes of the sides of $\Delta A'B'C'$ are not equal to the slopes of the corresponding sides of ΔABC, BUT the absolute values of corresponding sides ARE equal.

5. **Rotate** Δ ABC 90° clockwise around the point (0, 0).

Using the Pythagorean Theorem, calculate the length of side A'B'. Round your answer to the nearest tenth.

$a^2+b^2=c^2$
$1^2+3^2=c^2$
$1+9=c^2$
$10=c^2$
$\sqrt{10}=c$

$\overline{A'B'} = 3.2$ units



Calculate the slope for each side of Δ A'B'C'.

Slope A'B'= $-1/3$

Slope B'C' = $4/2 = 2$

Slope A'C' = $-1/5$

How do the length of A'B' and the slopes of the sides compare to those of Δ ABC'?

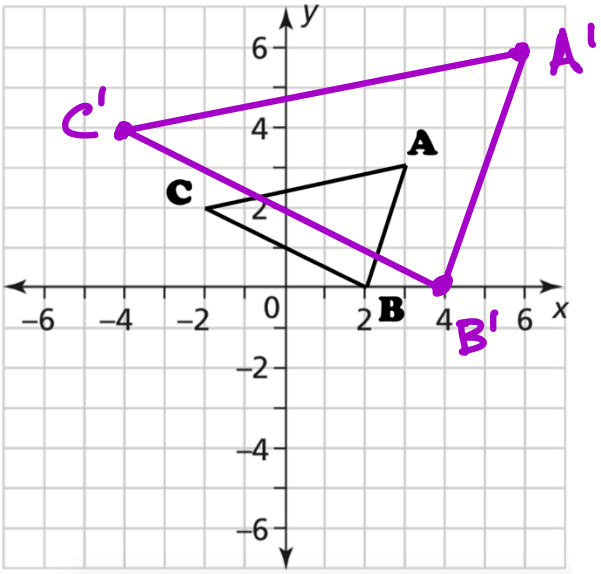
- The length of A'B' is the same as the length of AB.
- The slopes of the sides of ΔA'B'C' are not equal to the slopes of the corresponding sides of ΔABC.

6. **Dilate** Δ ABC by a factor of two from the origin (0, 0).

Using the Pythagorean Theorem, calculate the length of side A'B'. Round your answer to the nearest tenth.

$a^2+b^2=c^2$
$1^2+3^2=c^2$
$1+9=c^2$
$10=c^2$
$\sqrt{10}=c$

$\overline{A'B'} = 3.2$ units



Calculate the slope for each side of Δ A'B'C'.

Slope A'B'= $\frac{6}{2} = 3$

Slope B'C' = $\frac{-4}{8} = -\frac{1}{2}$

Slope A'C' = $\frac{2}{10} = \frac{1}{5}$

How do the length of A'B' and the slopes of the sides compare to those of Δ ABC'?

- The length of A'B' is not the same as the length of AB. It is twice as long!
- The slopes of all corresponding sides are equal.

7. For which transformations ae the following statements true? Check the appropriate boxes.

	Translation	Reflection	Rotation	Dilation
Corresponding **sides** of the Preimage and Image are **parallel**.	X			X
Corresponding **sides** of the Preimage and Image are the **same size**.	X	X	X	
Corresponding **angle measures** of the Preimage and Image are the **same size**.	X	X	X	X
The image and preimage are **congruent**.	X	X	X	

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