

Welcome to Geometry

Tuesday - September 1

In Class

- Introduction
 - Supplies
 - Homework Expectations
- Introduction to Transformations
- Reflections

Homework

- Get class supplies (Must have all by Tuesday Sep. 8)
- Fill out 'My Forms' on my website (Wednesday Sep. 9)
- LTA R1 due **Thursday Sep. 10**

Aug 28-11:15 AM

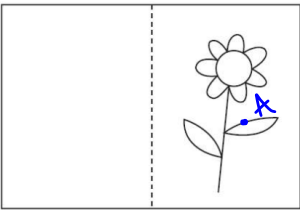
Rigid Transformations

Reflections

Name _____

Date _____

1. On a blank sheet of paper, draw any object, such as the flower pictured here, placing it on either the left half or the right half of the paper. Mark any point on your picture with the letter A .



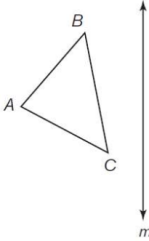
2. Fold the paper in half with the picture facing out, and trace the picture on the blank side of the folded paper. Your new image will be opposite your original picture when you unfold the paper. Mark the image of A as A' . Draw a line (with a ruler) along the fold line, and then draw $\overline{AA'}$.

3. Describe the relationship between the fold line and $\overline{AA'}$.

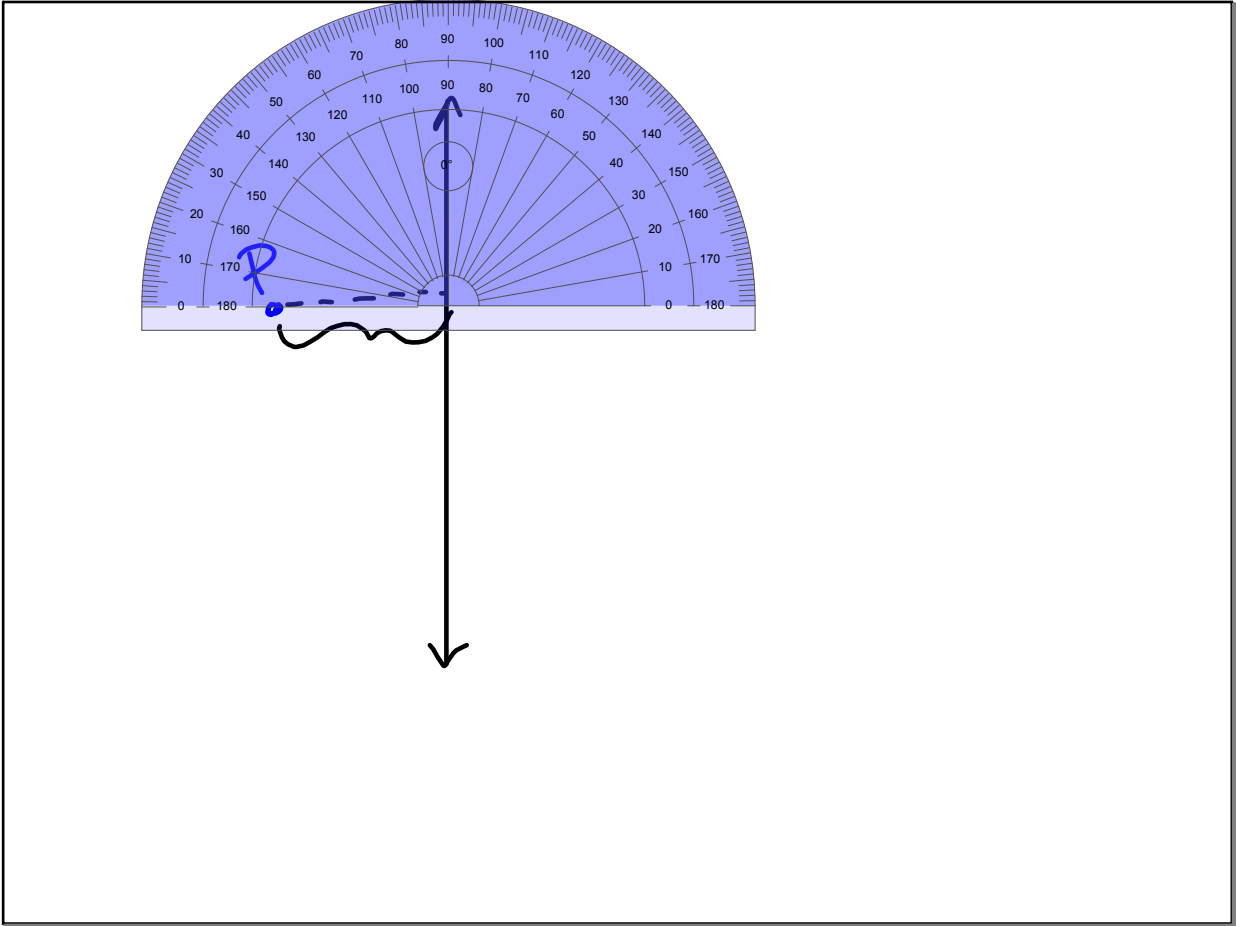
The fold line is perpendicular to $\overline{AA'}$

4. Place a Mira along the fold line and check the reflection image of your picture.

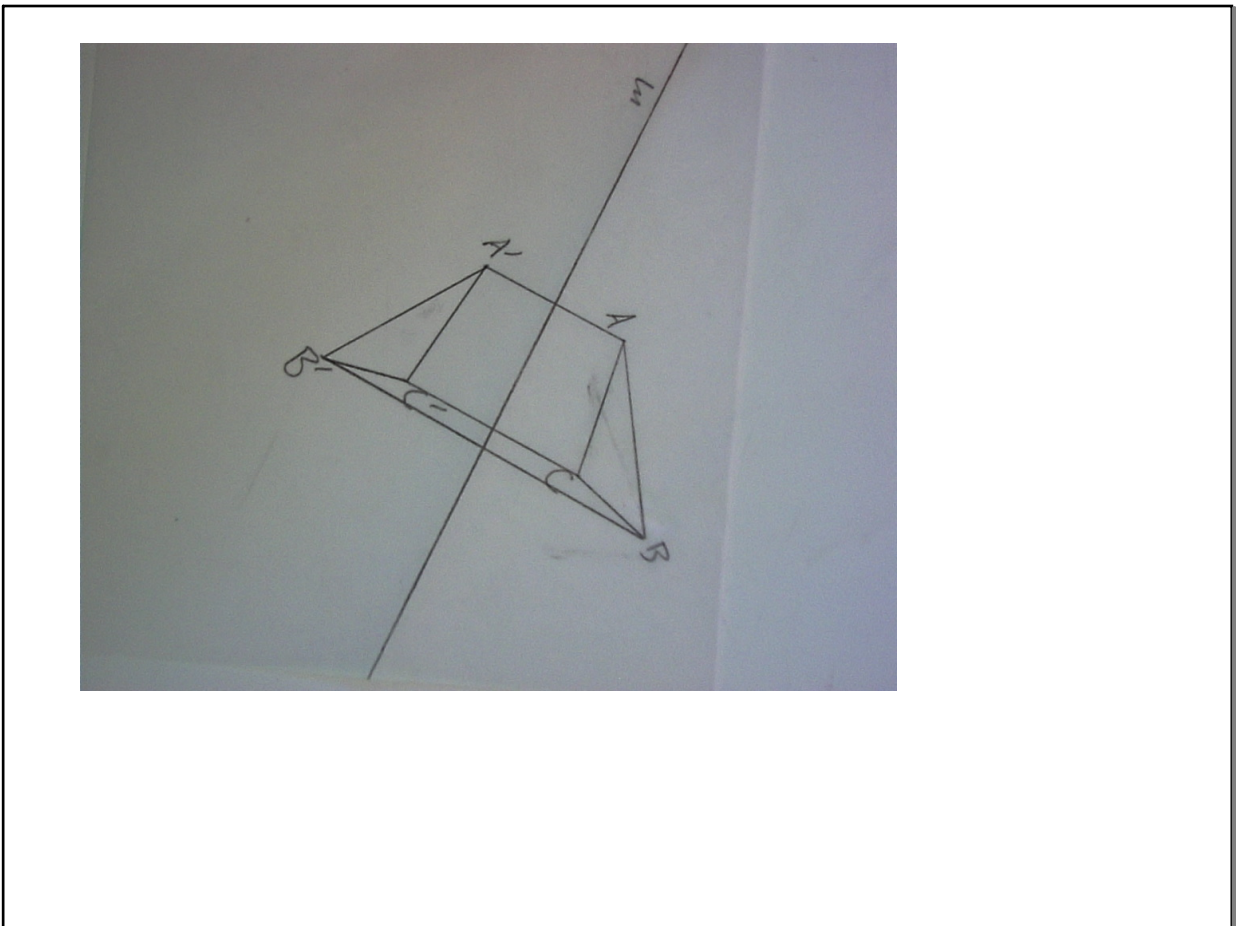
5. Using a different piece of paper, draw $\triangle ABC$ and a reflecting line m . Reflect the triangle in line m to draw the image $\triangle A'B'C'$. Then draw $\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$.
 - a. How is line m related to each segment $\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$?



- b. Given any point P , in the plane of the paper, describe how you can find its image P' under a reflection in line m . Use the relationship from question 5a to help describe how you can perform the reflection.

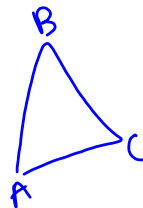


Sep 2-2:14 PM



Sep 2-2:11 PM

- c. Given any point P' , describe how you could find its preimage, point P , in a reflection in line m .



6. The **orientation** is the direction you would walk around a figure following its perimeter. For the reflections in this activity, describe the orientation of a figure's image in relation to the original figure (the preimage). **Make sure you consider the same order of the points in the image as you used in the preimage.** (Example: A to C to B in the preimage corresponds to A' to C' to B' in the image.)

Changes!

7. Suppose a reflection is used to find the image of a figure, and then you reflect that image in another line. Describe the orientation of the final image compared with the orientation of the original figure. Test your conjecture.

Same!

8. Write a summary of the properties of reflections.

Reflections Summary:

the opposite of the original

"A flip over a line"

P to the line of reflection is the same distance as P' to the line of reflection.

P to P' is \perp to the line of Reflection

$\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$ are parallel to each other

1 Reflection changes the orientation of the original

2 Reflections keeps the orientation the same as the original

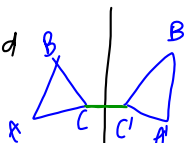
Preimage \cong Image Same size
Same shape
congruent

Angle measures are preserved

$$\angle A \cong \angle A'$$

Distances are preserved

$$\overline{AB} \cong \overline{A'B'}$$



A line of reflection is the perpendicular bisector of segments connecting pre-image and image points.

Geometry

In Class: Wednesday - September 2

- Introduction to Transformations
 - > Finish Reflections and Discuss
 - > Start Translations

Homework:

- Get class supplies (Must have all by Tuesday Sep. 8)
- Fill out 'My Forms' on my website (Wednesday Sep. 9)
- LTA R1 due Thursday Sep. 10

Aug 28-11:15 AM

Grab Rulers!

Rigid Transformations

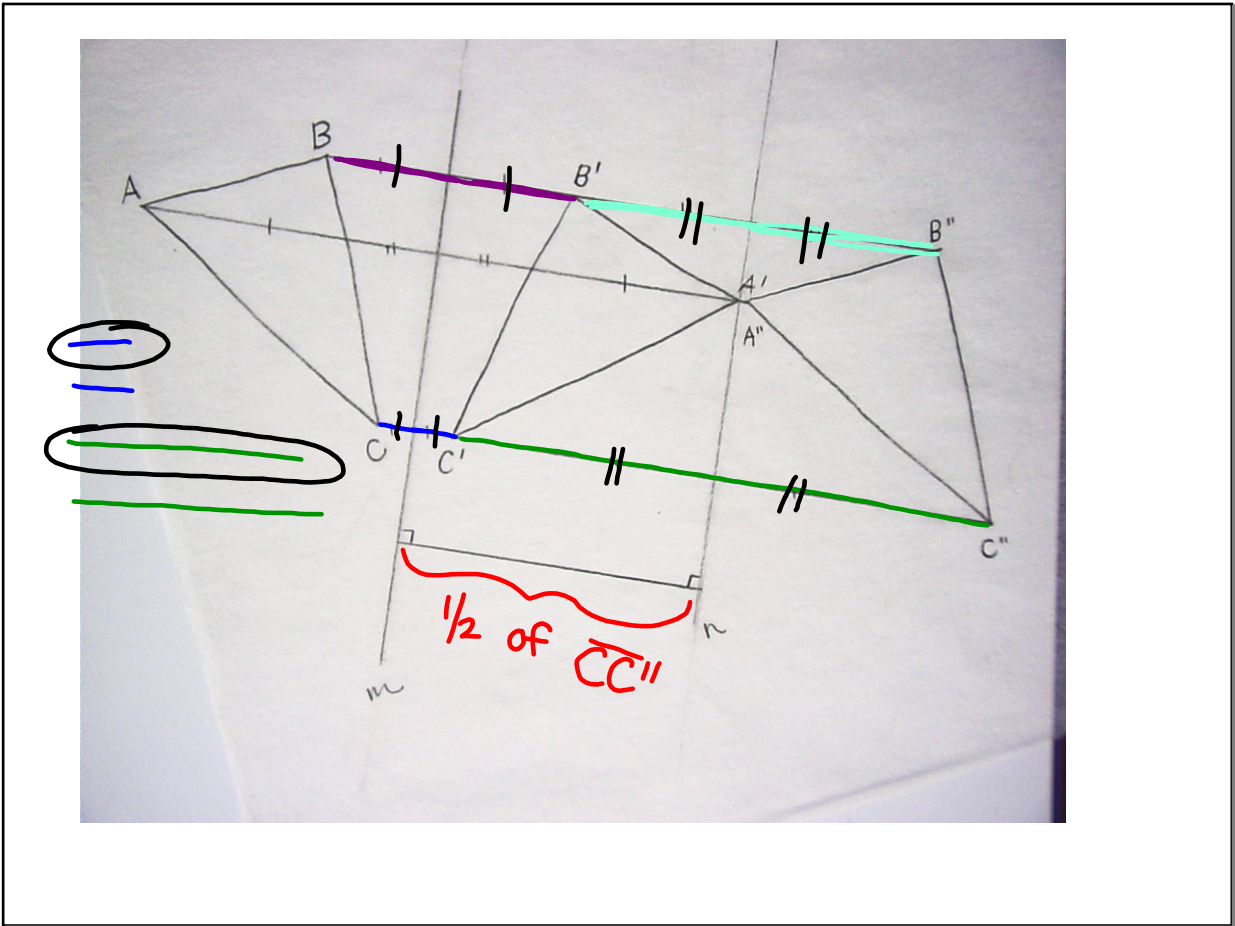
Name _____

Translations

Date _____

Trace lab sheet first! →

1. Using the drawing on the lab sheet, reflect $\triangle ABC$ in line m to obtain $\triangle A'B'C'$. Label the image triangle.
2. Reflect $\triangle A'B'C'$ in line n to obtain $\triangle A''B''C''$. Label the image triangle. Note that line n is parallel to line m .
3. Draw $\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$. Then measure each of these segments. What do you notice about these three segments?
 - a. What do you notice about the length of this segment?
 - b. Why is this segment half the length of $\overline{AA'}$, $\overline{BB'}$, and $\overline{CC'}$?
5. Explain why the segments in question 3 are parallel.
6. Explain why the segments in question 3 are equal in length.
7. Triangle $A''B''C''$ is the translation image of $\triangle ABC$ under the translation that takes A to A'' ? What is a translation?



Sep 3-8:13 AM

8. Given any translation that takes A to B shown to the right, find two reflecting lines that together could be used to achieve the same result.

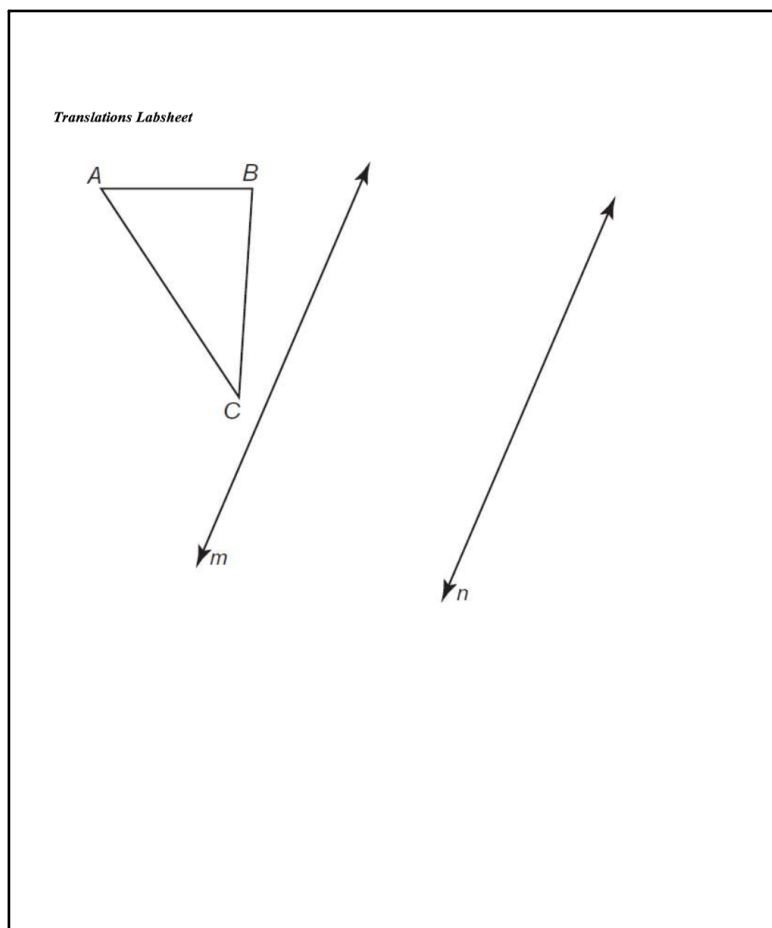
9. Are the reflecting lines that you found in question 8 unique?
NO!

10. What must be true about the two reflecting lines that can be used to achieve a translation that takes A to B ?

\overline{mn} is $\frac{1}{2}$ the length of \overline{AB}
 m is parallel to n — perpendicular
 $m \perp \overline{AB}$ and $n \perp \overline{AB}$

11. A translation that takes A to B is followed by a translation that takes B to C as shown in the figure below. The combination of these two translations can also be accomplished by using four reflecting lines, two parallel lines for each translation. However, the same result can be accomplished using only two parallel reflecting lines. Using the drawing below, find two parallel lines that could be used to complete the combination of these two translations or in other words to take A to C .

12. Write a summary of the properties of translations.



Geometry

In Class: Thursday - September 3

- Introduction to Transformations
- Finish Translations and Discuss
- Start Rotations?

Homework:

- Get class supplies (Must have all by Tuesday Sep. 8)
- Fill out 'My Forms' on my website (Wednesday Sep. 9)
- LTA R1 due Thursday Sep. 10

Translations Summary:

"to slide a figure across a plane"

Preimage \cong Image
Figure Figure

$\frac{1}{2}$ of segment
is in between
reflecting lines

Angle measure is Preserved

$$\angle A \cong \angle A'$$

Distance is Preserved

$$\overline{AB} \cong \overline{A'B'}$$

Orientation is Preserved.

Segments connecting preimage
and image points are
parallel and the same length.

Sep 2-7:37 AM

Rigid Transformations Name _____

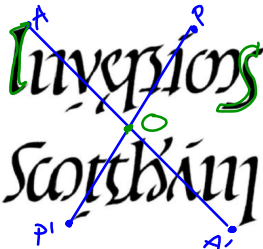
Rotations Date _____

Consider the design shown at the right.

- Choose and label any point P on the top line of the design. For example, let P be the upper left tip of the I in *Inversions*.
- The design reads the same right side up or turned around. Find and label the corresponding image P' of point P in the inverted image.
- Repeat questions 1 and 2 for another pair of points, A and A' .
- Draw (using a ruler) the segments $\overline{PP'}$ and $\overline{AA'}$. Label the intersection point of these two segments point O .
- Trace the top line of the design on tracing paper. Place your pencil on point O and turn the tracing paper around point O . Does the traced design match the bottom line of the design? If so, through how many degrees has the tracing been rotated?

Consider the diagram on the absheet showing $\triangle ABC$.

- Use the diagram to reflect $\triangle ABC$ in line m to obtain $\triangle A'B'C'$. Label the image.
- Reflect $\triangle A'B'C'$ in line n to obtain $\triangle A''B''C''$. Label the image.
- Dividing up the work, draw and then measure $\angle AOA'$, $\angle BOB'$, and $\angle COC'$.
- Measure the angle between lines m and n . That is, the angle in which $\triangle A'B'C'$ is located.



Geometry

In Class: Tuesday - September 8

- Supplies Check!
- Introduction to Transformations
 - > Finish Rotations and Discuss

Homework:

- p. 396 #34 (worksheet)
- Fill out 'My Forms' on my website (by tomorrow!)
- LTA R1 due Thursday Sep. 10

Binder and Dividers
Composition Notebook
Spiral/Loose leaf
Calculator

Aug 28-11:15 AM

10. What is the relationship between the measures of the angles in question 8 and question 9.

measure of angle between lines is $\frac{1}{2}$ of $\angle AOA''$

11. Explain why the measures of $\angle AOA'$, $\angle BOB'$, and $\angle COC''$ are twice the measure of the angle between lines m and n .

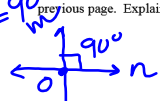
12. Triangle $A'B'C'$ is the image of $\triangle ABC$ under a rotation of 150° about point O . What is a rotation?

13. To rotate a figure 270° , what can you say about the angle measure between reflecting lines that could be used?

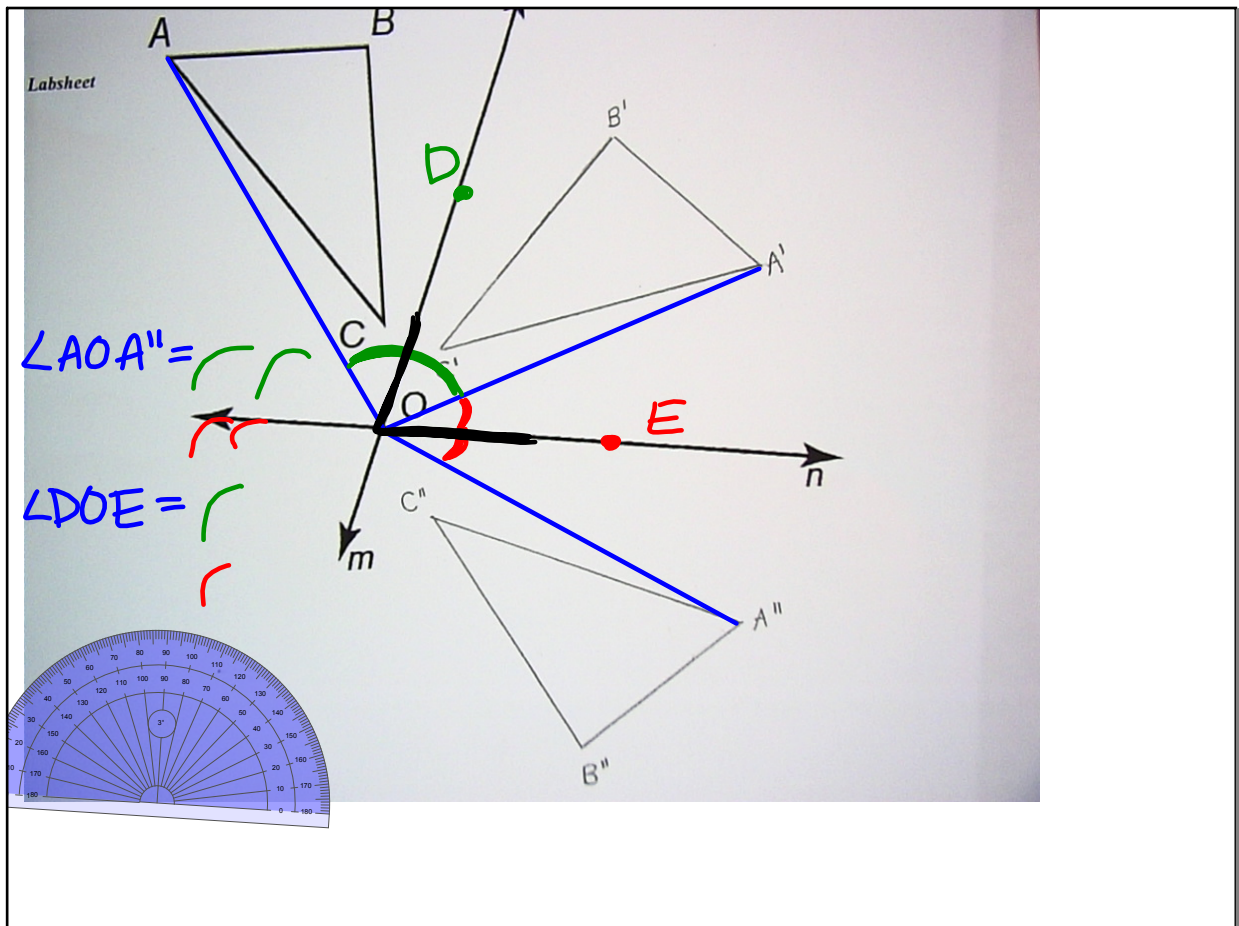
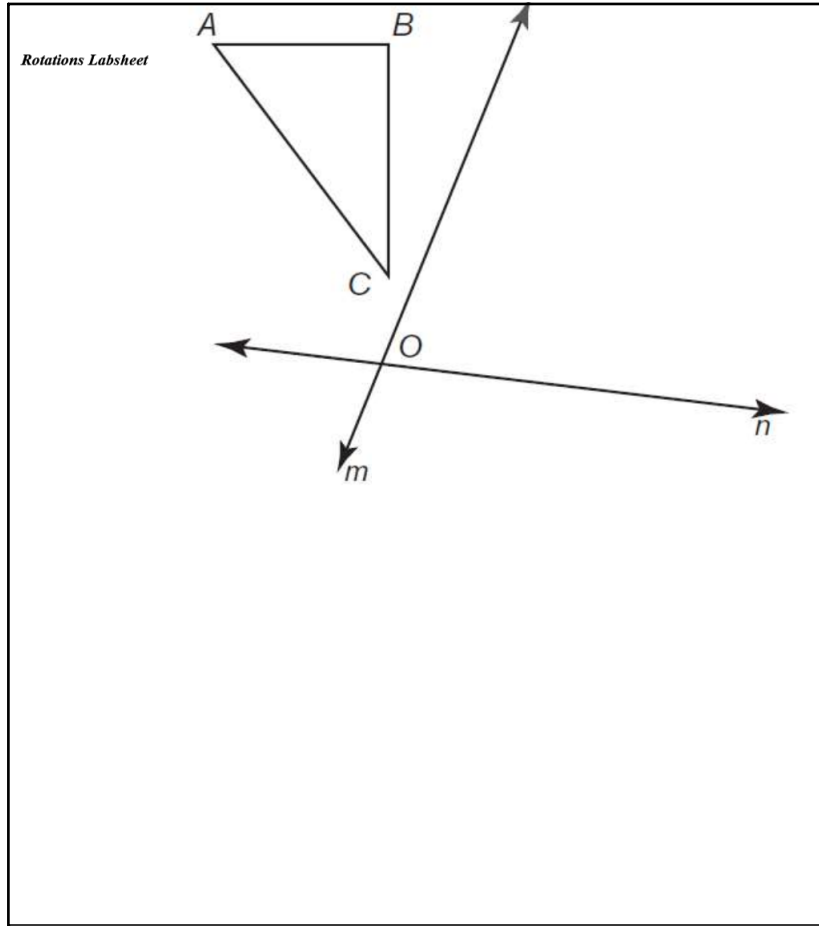
$\frac{270^\circ}{2} = 135^\circ$

14. Find two reflecting lines that could be used to complete the rotation of the design on the previous page. Explain your reasoning.

Any 2 perpendicular lines with center O



15. Write a summary of the properties of rotations.



Sep 8-12:47 PM

Rotations Summary:

“turn or spin around a point”

↑ center

Preimage Figure \cong Image Figure

Distances are Preserved.

Angle measure is Preserved.

Orientation is Preserved.

The angle of Rotation is equal
to the measure of $\angle AOA''$

↑
connects
preimage to
center to
image points

Aug 29-9:44 AM

Sep 9-12:36 PM