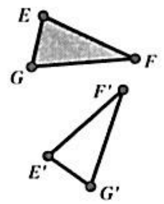
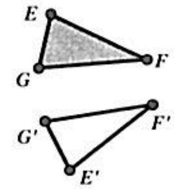
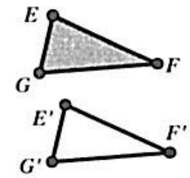
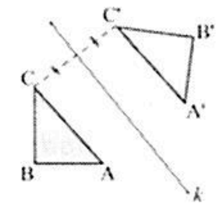
Name: Key   Date: ____________

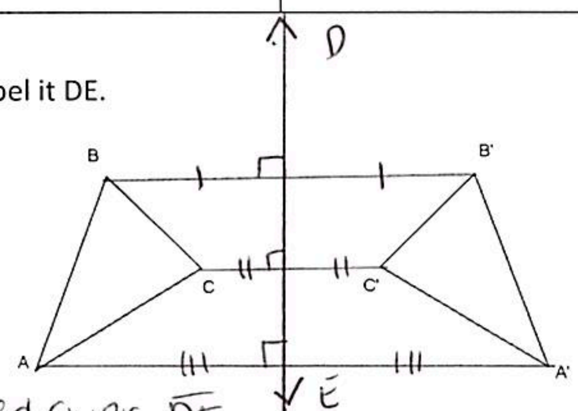
UNIT 2   **LESSON 3**

AIM: HOW DO WE CONSTRUCT REFLECTIONS?

Do Now- Identify each rigid motion.

a)	b)	c)	d)
			
Rotation	Reflection	Translation	Reflection
Pre-image: ΔGEF	Pre-image: ΔGEF	Pre-image: ΔGEF	Pre-image: ΔABC
Image: $\Delta G'E'F'$	Image: $\Delta G'E'F'$	Image: $\Delta G'E'F'$	Image: $\Delta A'B'C'$

Sketch the line of reflection and label it DE.



1. ΔABC is reflected over $\overline{DE}$ maps onto $\Delta A'B'C'$.

2. $\overleftrightarrow{DE}$ is equidistant from each pair of corresponding verticies.

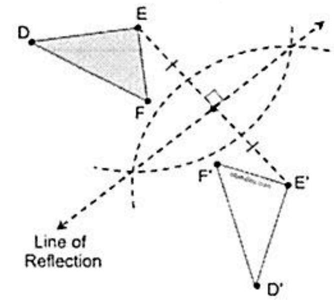
3. $\overline{DE}$ is the perpendicular bisector of each pair of corresponding verticies.

4. Notation used for a reflection $r_{\overline{DE}}(\Delta ABC) \cong \Delta A'B'C'$

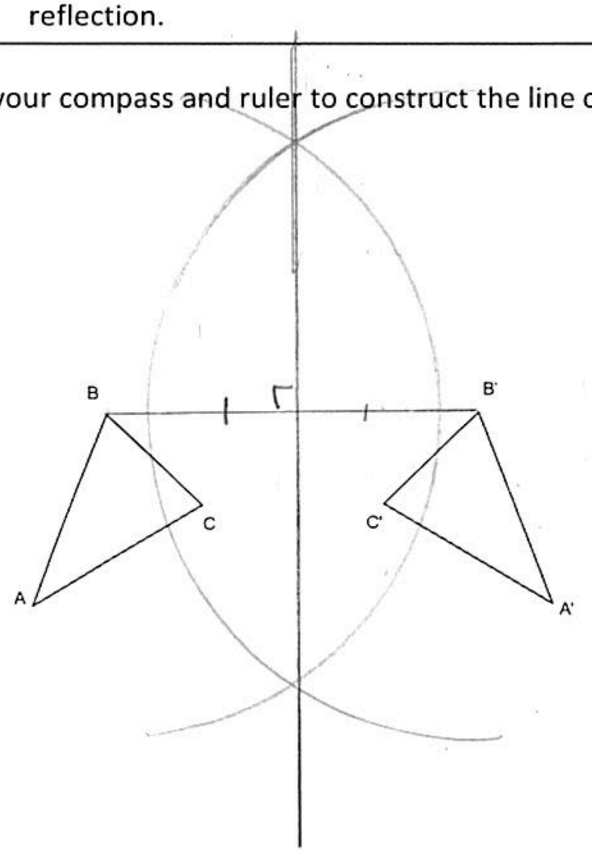
5. Orientation: is NOT preserved !

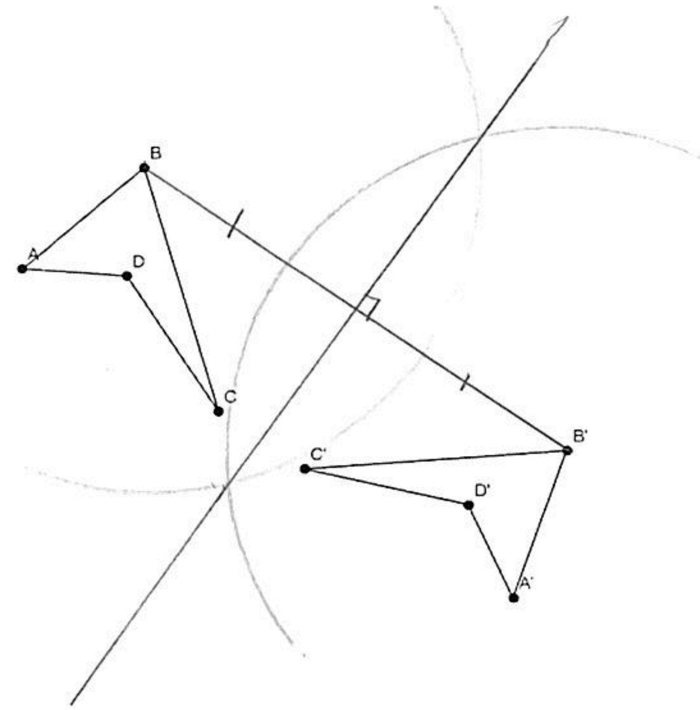
HOW TO CONSTRUCT THE LINE OF REFLECTION:

1. Connect any vertex of the pre-image to the vertex of its image. For instance, A to A'.
2. Construct the perpendicular bisector of the segment formed.
3. The perpendicular bisector that you created is your line of reflection.



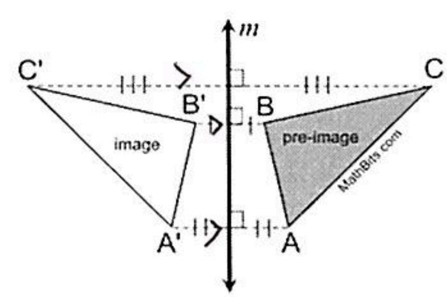
Use your compass and ruler to construct the line of reflection *EF*.





Properties that are preserved under a **reflection** from pre-image to the image:

1. Distance (lengths of segments are the same)
2. angle measurement (angles stay the same)
3. parallelism (things that were parallel are still parallel)
4. collinearity (points on a line, remain on the line)



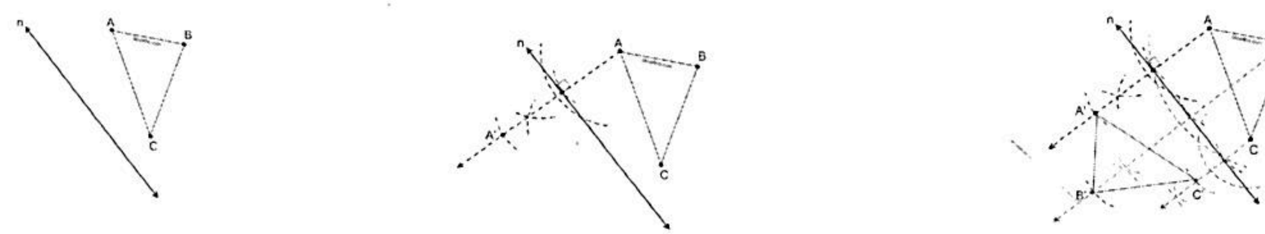
In this reflection that maps ΔABC to $\Delta A'B'C'$, the distances from the pre-image points to the image points vary (are not necessarily equal), but the segments representing these distances are ***parallel***.

CONCLUSION:

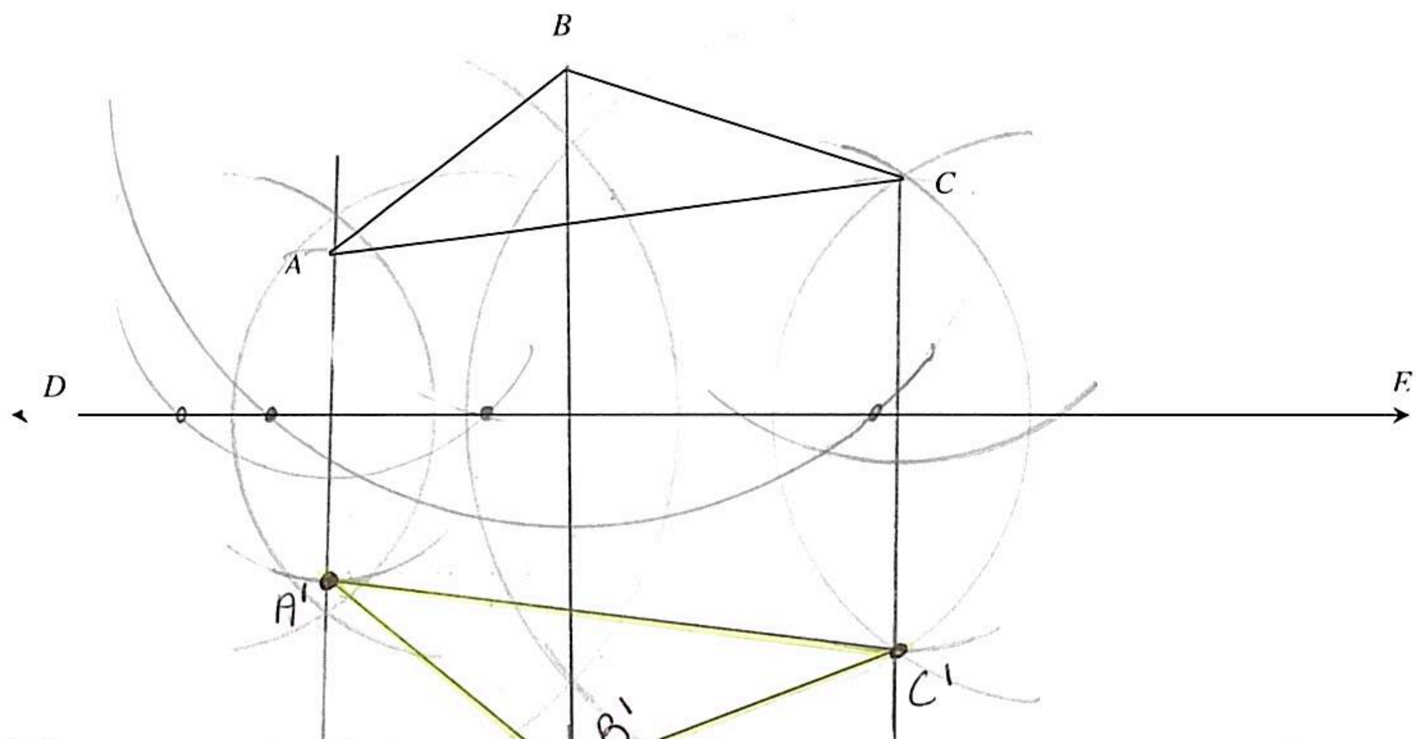
$\overline{AA'} \neq \overline{BB'} \neq \overline{CC'}$ but $\overline{AA'} \parallel \overline{BB'} \parallel \overline{CC'}$

How to construct the reflected image when given a line of reflection and the pre-image:

1. Choose a starting vertex (A).
2. Construct a perpendicular bisector from A to the line of reflection.
3. Measure the length of A to the intersection point.
4. Copy this length on the perpendicular bisector starting at the intersection point to find A'. (You have located one of the vertices of the image.)
5. Repeat this step for each of the vertices.



1. Construct the reflection of ΔABC over line DE.

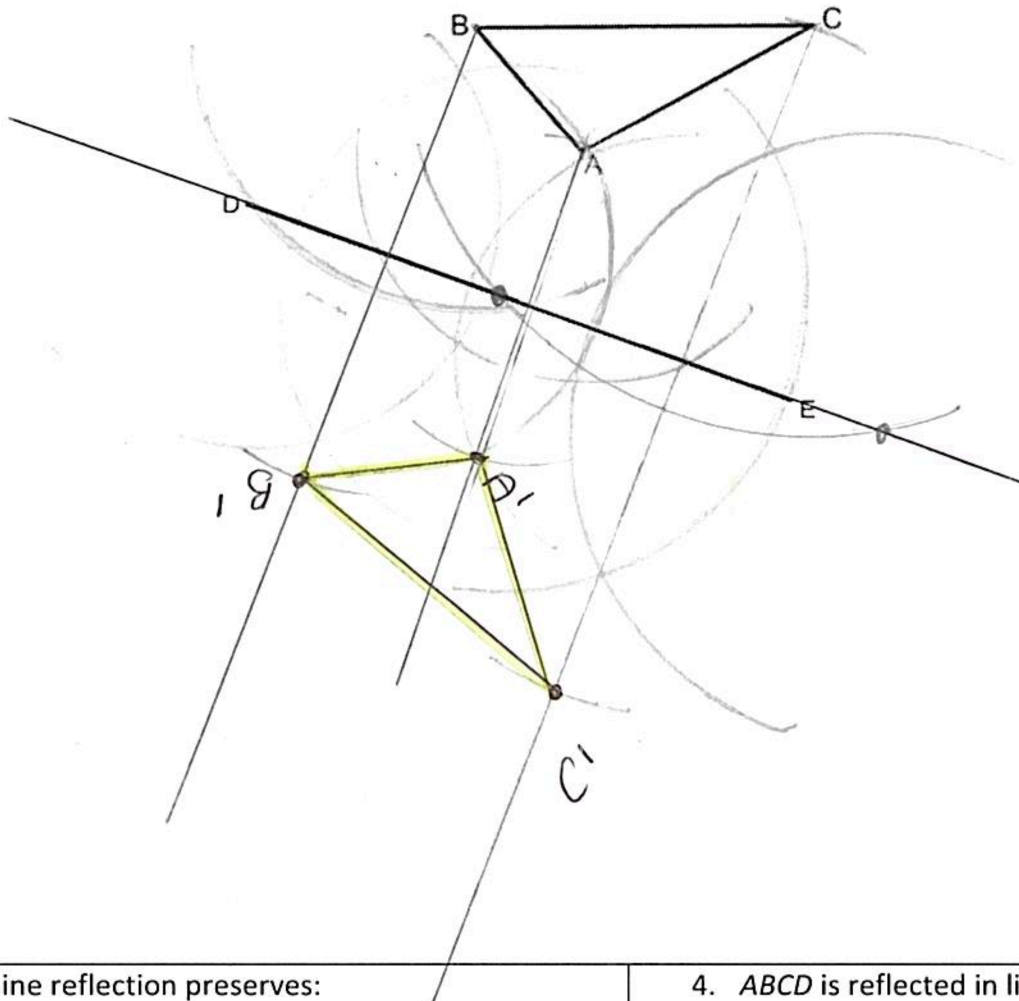


(a) What can you say about the image and its pre-image?

$\Delta ABC \cong \Delta A'B'C'$ b/c a reflection is a rigid motion which preserves distance and angle measurement.

b. Is orientation preserved? NO! The direction of the vertices change!

2. Construct $\Delta A'B'C'$ the image of $\Delta \mathbf{ABC}$ after a reflection across $\overline{\boldsymbol{DE}}$.



3. A line reflection preserves:

(1) distance and orientation

(2) angle measurement and orientation

(3) distance, but not angle measurement

(4) distance and angle measurement

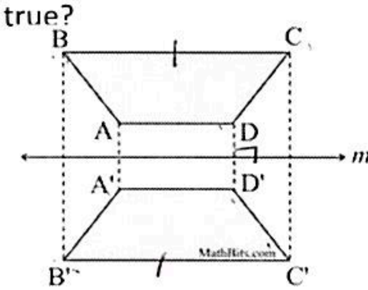
4. *ABCD* is reflected in line *m*. Which of the statements is NOT true?

5. $\overline{BB'} \parallel \overline{CC'}$ ✓

6. $\overline{DD'} \perp m$ ✓

7. $\overline{AB} \parallel \overline{A'B'}$

8. $\overline{BC} \cong \overline{B'C'}$



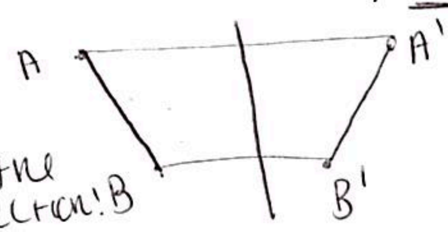
12. $\overline{AB}$ is reflected to create image $\overline{A'B'}$. Which statement is always true?

(1) A'A = B'B

(2) AB = A'B'

(3) $\overline{AB} \perp \overline{A'B'}$

(4) $\overline{AA'} \perp \overline{BB'}$ → they are ⊥ to the line of reflection! B



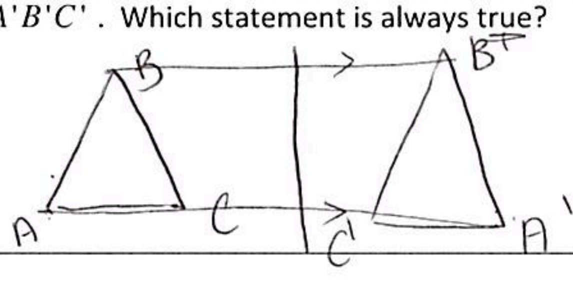
13. ΔABC is reflected to create image $\Delta A'B'C'$. Which statement is always true?

1) $\overline{AB} \parallel \overline{A'B'}$

(2) $\overline{AA'} \perp \overline{BB'}$

(3) $\overline{AB} \perp \overline{A'B'}$

(4) $\overline{AA'} \parallel \overline{BB'}$



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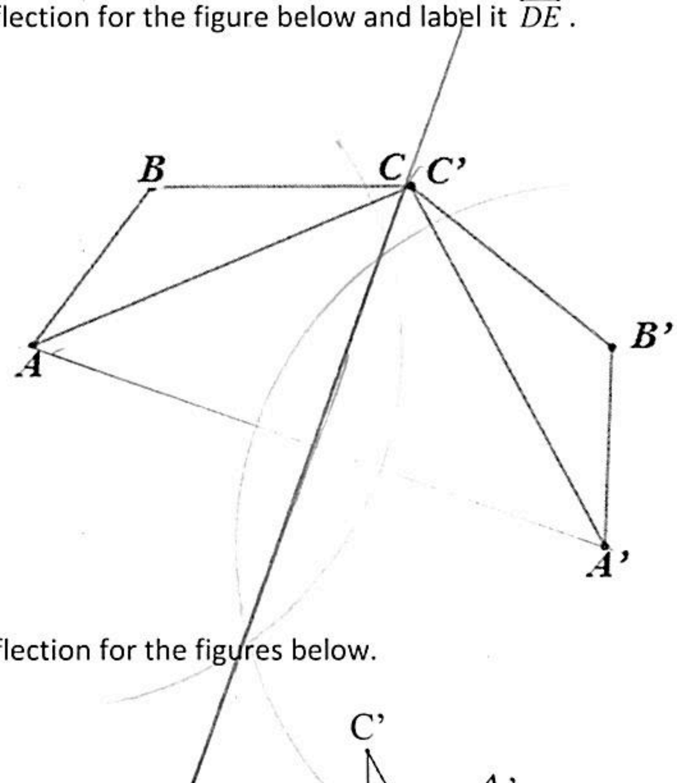
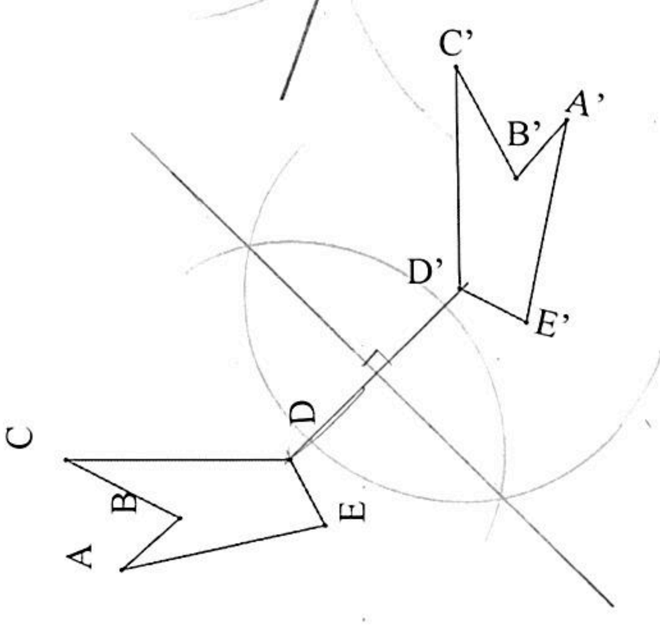
UNIT 2　　　　　　　　　　　　　　　　　　**LESSON 2 HOMEWORK**

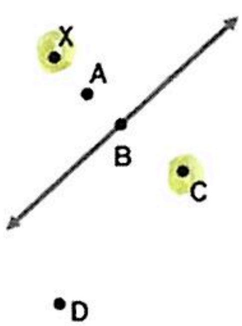
1. Construct the line of reflection for the figure below and label it $\overleftrightarrow{DE}$.



2. Construct the line of reflection for the figures below.

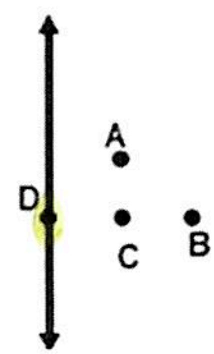


3. Which point represents the reflection of *X*?



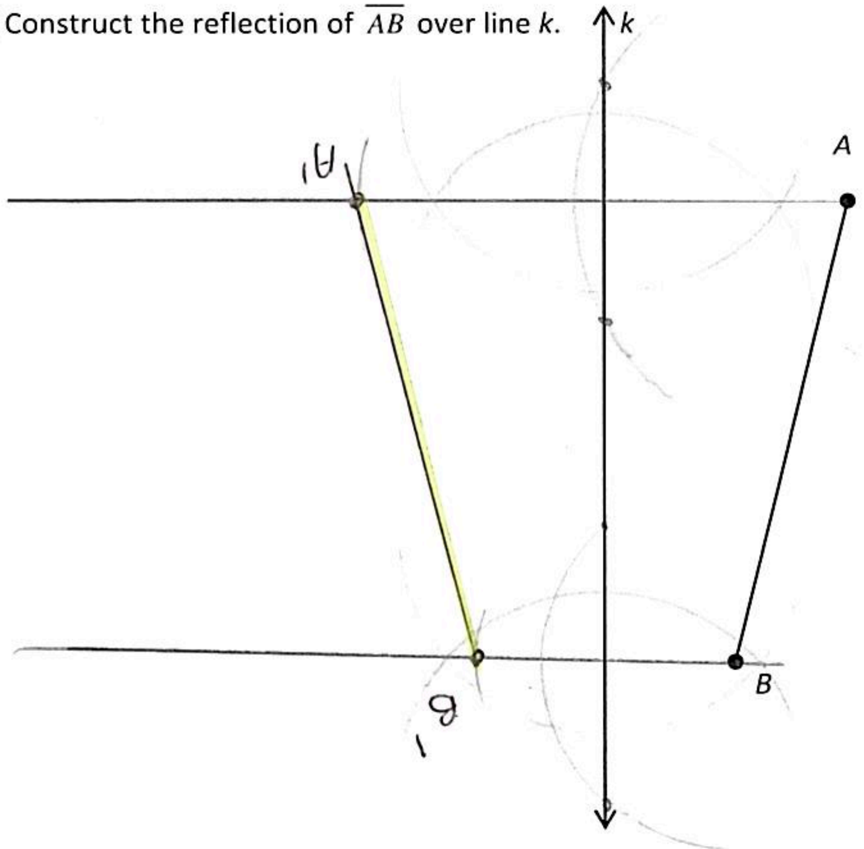
C

4. Which point represents the reflection of *D*?



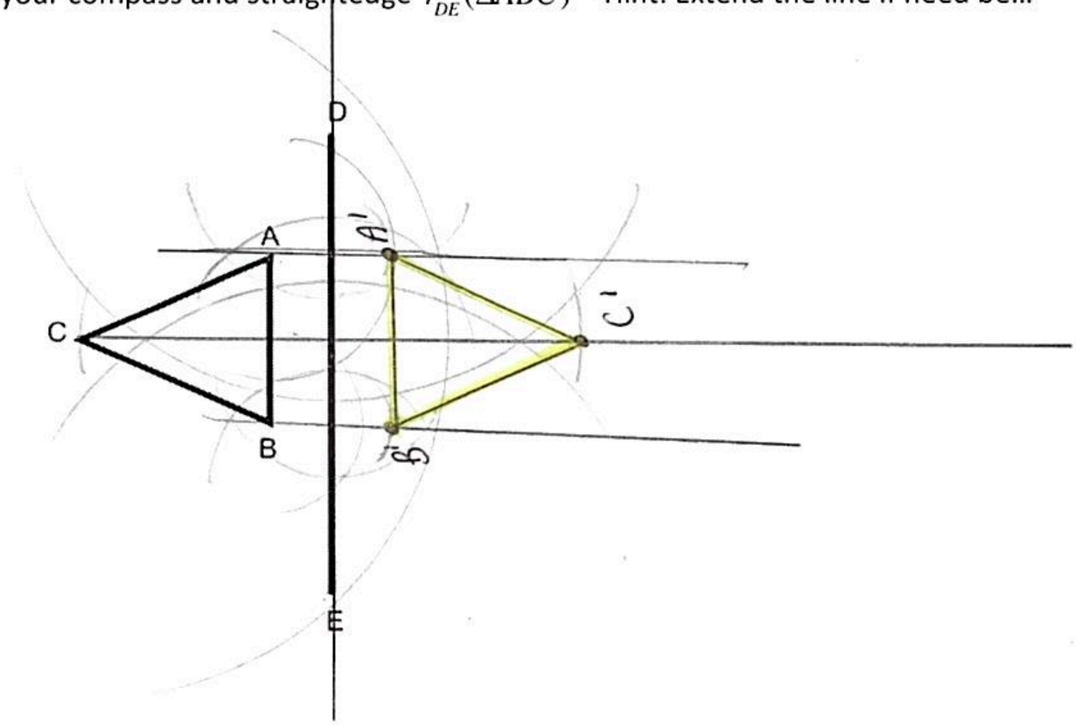
D

5) Construct the reflection of $\overline{AB}$ over line k.



B) Why is $\overline{A'B'}$ an example of a rigid motion? yes! A reflection preserves distance and angle measurement

6. Use your compass and straightedge $r_{DE}(\Delta ABC)$ *Hint: Extend the line if need be...



e line of reflection is perpendicular to the segment connecting a pre-image point to its image.

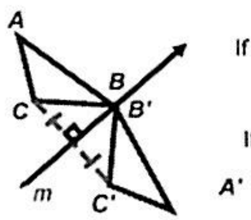
The line of reflection bisects the segment connecting a pre-image point to its image.

The line of reflection intersects the segment connecting a pre-image point and its image at its midpoint.

$$AA' \neq BB' \neq CC' \text{ but } \overline{AA'} \parallel \overline{BB'} \parallel \overline{CC'}$$

Reflection

A reflection is a transformation of points over a line. This line is called the line of reflection. The result looks like the preimage was flipped over the line. The preimage and the image have opposite orientations.



If a point B is on line m, then the image of B is itself ($B = B'$).

If a point C is not on line m, then m is the perpendicular bisector of $\overline{CC'}$

The reflection across m that maps $\Delta ABC \rightarrow \Delta A'B'C'$ can be written as $R_m(\Delta ABC) = \Delta A'B'C$