Lesson 4-13L: Sequence of Rigid Motions Proofs

AGENDA:

- Homework 4-12 Check & Review
- Lesson Notes, Guided Practice, Individual Practice

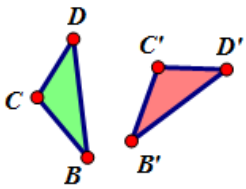
Homework:

- Problem Set in Notes
- Test Remediation Ch 3 - TODAY after school

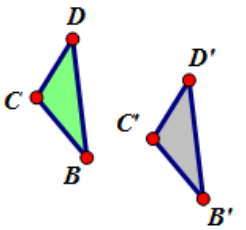
Problem Set 4-12 LAB

1. Which transformation has taken place?

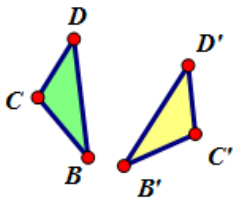
a) _____



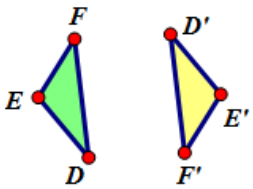
b) _____



c) _____



d) _____

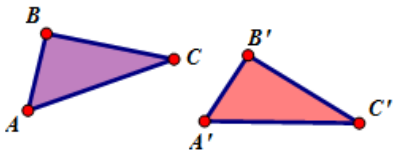


2. Complete the chart.

Relationship between pre-image and image	TRANSLATION	SINGLE LINE REFLECTION	POINT REFLECTION; ROTATION 180°	ROTATION
Orientation - Direct or Indirect				
Location of Invariant Points				
What to look for				

3. Given that ΔABC was mapped to ΔA'B'C' using a single transformation.

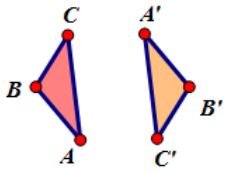
a) Why couldn't this mapping have resulted by a single translation?



b) What transformation must have mapped these two triangles? Explain your answer.

4. Given that ΔABC was mapped to ΔA'B'C' using a single transformation.

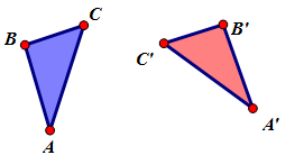
a) Use orientation to explain why this mapping could not have resulted from a single line reflection:



b) What transformation must have mapped these two triangles? Explain your answer.

5. ΔABC is congruent to ΔA'B'C'. A student tries to determine which of these single transformations mapped ΔABC onto ΔA'B'C'. She concludes that a reflection had to be involved and more than one transformation had to map these on two triangles.

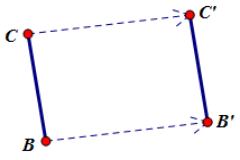
a) How can she conclude that a line reflection was involved?



b) How can she conclude that this wasn't just a single line reflection?

c) How can she conclude that this wasn't just a point reflection?

6. $\overline{BC}$ was translated by the given vector.



a) Explain why $\overline{BC} \cong \overline{B'C'}$.

b) What other segments in the diagram are congruent? _____

Why?

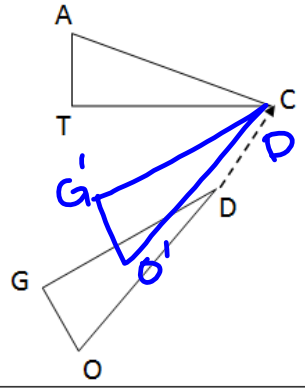
c) Explain why $\overline{BC} \parallel \overline{B'C'}$.

b) What other segments in the diagram are parallel? _____

Why?

Recall: when we perform a series of rigid motions to determine if two triangles are congruent (and verify an isometry) we look to follow the steps in order to get the 3 vertices to map onto their corresponding vertices:

1. Translate: vertex to corresponding vertex

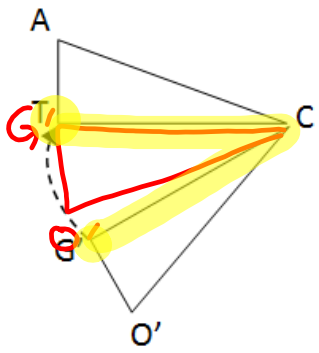


Maps D to C, O to O', and G to G'

△DOG ONTO △CAT ✓

TRANSLATE △DOG BY VECTOR $\overrightarrow{DC}$

2. Rotate about a shared vertex to get a common side



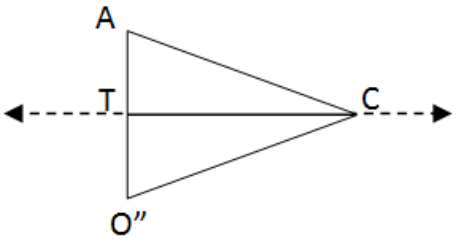
Maps C to itself, O' to O", G' to T

△DOG ONTO △CAT ✓✓

ROTATE AROUND C

$m\angle G'CT$

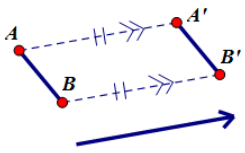
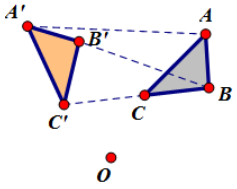
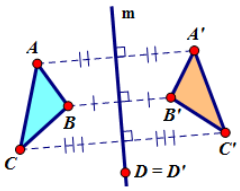
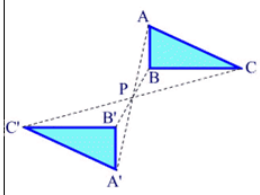
3. Reflect over a common/shared side

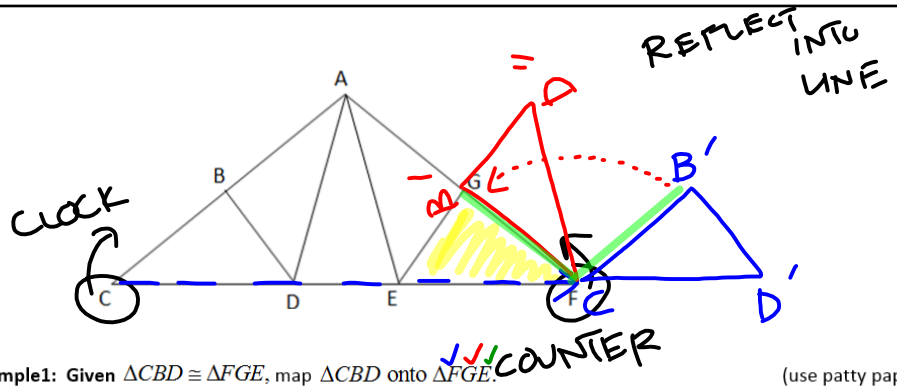


Maps C & T to themselves, O" to A

REFLECT INTO $\overleftrightarrow{CT}$

By connecting the corresponding vertices (each pre-image to its corresponding image), we may see a single rigid motion. Here is a summary of what to look for:

	Translation	Rotation	Line Reflection	Point Reflection (equiv: 180° rotation)
What to look for to identify the transformation (connect pre-image points to their corresponding image points to form the segments)	Parallel & congruent segments (all points moved by same direction & same amount). 	No parallel connections.  Note the distance from the center of dilation is the same for a pre-image with its image but is different among all pre-images.	Parallel but not all congruent segments. The line of reflection is the perpendicular bisector of the segment joining every pre-image point with its image. 	The segments all connect at the same point. The point of reflection is the midpoint of all the segments. 



Example1: Given $\Delta CBD \cong \Delta FGE$, map ΔCBD onto ΔFGE. (use patty paper)

1) Translate ΔCBD such that C maps to F. B maps to B' and D maps to D'. Name the vector: $\overrightarrow{CF}$

2) Rotate $\Delta FB'D'$ such that F maps to itself. B' maps to G. D' maps to D''.
Name the fixed point: F Name the angle measure of the rotation: $m\angle B'FG$

3) Reflect $\Delta FGD''$ such that F and G map to THEMSELVES. D'' maps to E. Name the line of reflection: $\overleftrightarrow{FG}$

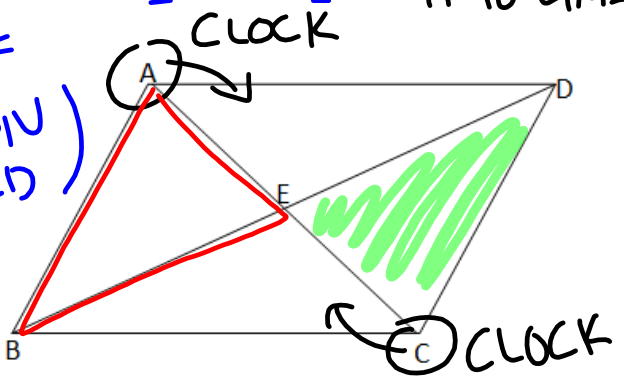
4) Have all of the vertices from ΔCBD mapped to ΔFGE? YES Is this a direct or an indirect isometry?
Explain:
INDIRECT ISOMETRY — TRANSLATIONS, ROTATIONS, REFLECTIONS PRESERVE & MEASURE & DISTANCE
INDIRECT - CHANGE IN ORIENTATION

Examples 2&3: For each identify the precise series of rigid motions that maps one triangle onto the other. State the line of reflection, point of reflection, fixed point and angle of rotation, and/or translation vector since these rigid motions preserve angle measure and distance.

2. Given: $\Delta AEB \cong \Delta CED$
Identify a precise series of rigid motions that maps ΔAEB onto ΔCED.

NO REFLECT INTO LINE

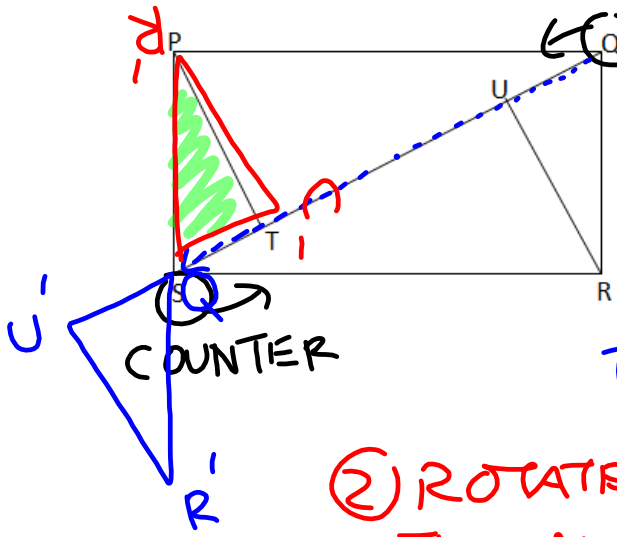
E MAPS TO ITSELF (NO TRANSLATION NEEDED)



ROTATE ΔAEB AROUND E, 180° TO MAP B TO D, A TO C, E TO ITSELF

3. Given: $\Delta STP \cong \Delta QUR$

Identify a precise series of rigid motions that maps ΔQUR onto ΔSTP.



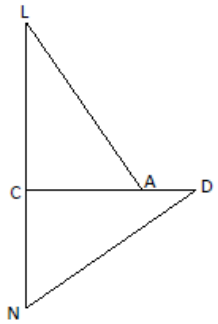
NO
REFLECT INTO LINE
COUNTER
TRANSLATE ΔQUR BY VECTOR $\overrightarrow{QS}$ TO MAP Q TO S, U TO U', R TO R'
② ROTATE AROUND S, 180° TO MAP R' TO P, U' TO T, S TO ITSELF

Name: 4-13L

GEOMETRY PROBLEM SET for Homework ~~4-12 LAB,~~ 4-9 Regents

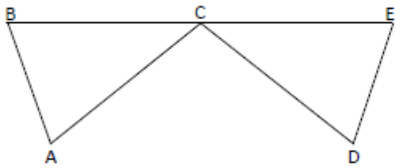
1. **Given:** $\Delta LAC \cong \Delta DNC$

   Identify a precise series of rigid motions ΔLAC onto ΔDNC.

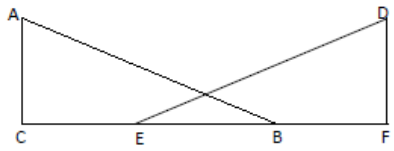


2. **Given:** $\Delta DEC \cong \Delta ABC$

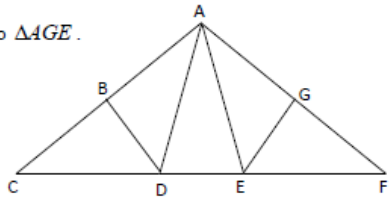
   Identify a precise series of rigid motions that maps ΔDEC onto ΔABC.



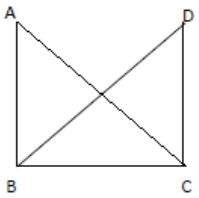
3. **Given:** $\Delta ABC \cong \Delta DEF$
Identify a precise series of rigid motions that maps ΔABC onto ΔDEF.



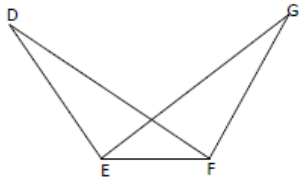
4. **Given :** $\Delta ABD \cong \Delta AGE$
Identify a precise series of rigid motions that maps ΔABD onto ΔAGE.



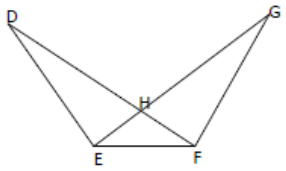
5. **Given :** $\Delta ABC \cong \Delta DCB$
Identify a precise series of rigid motions that maps ΔABC onto ΔDCB.



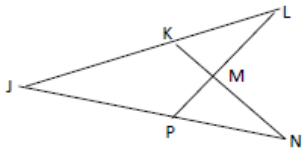
6. **Given :** $\Delta DEF \cong \Delta GFE$
Identify a precise series of rigid motions that maps ΔDEF onto ΔGFE.

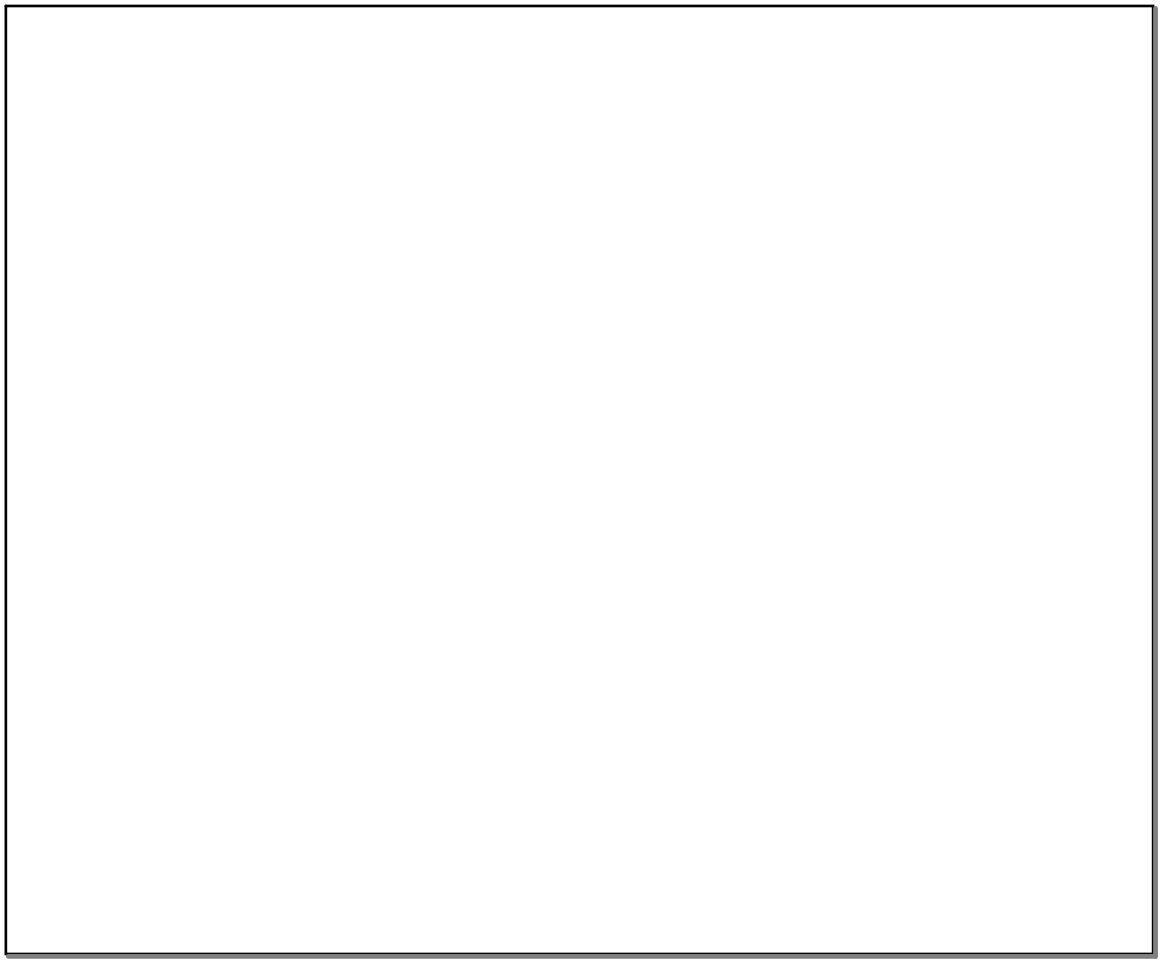


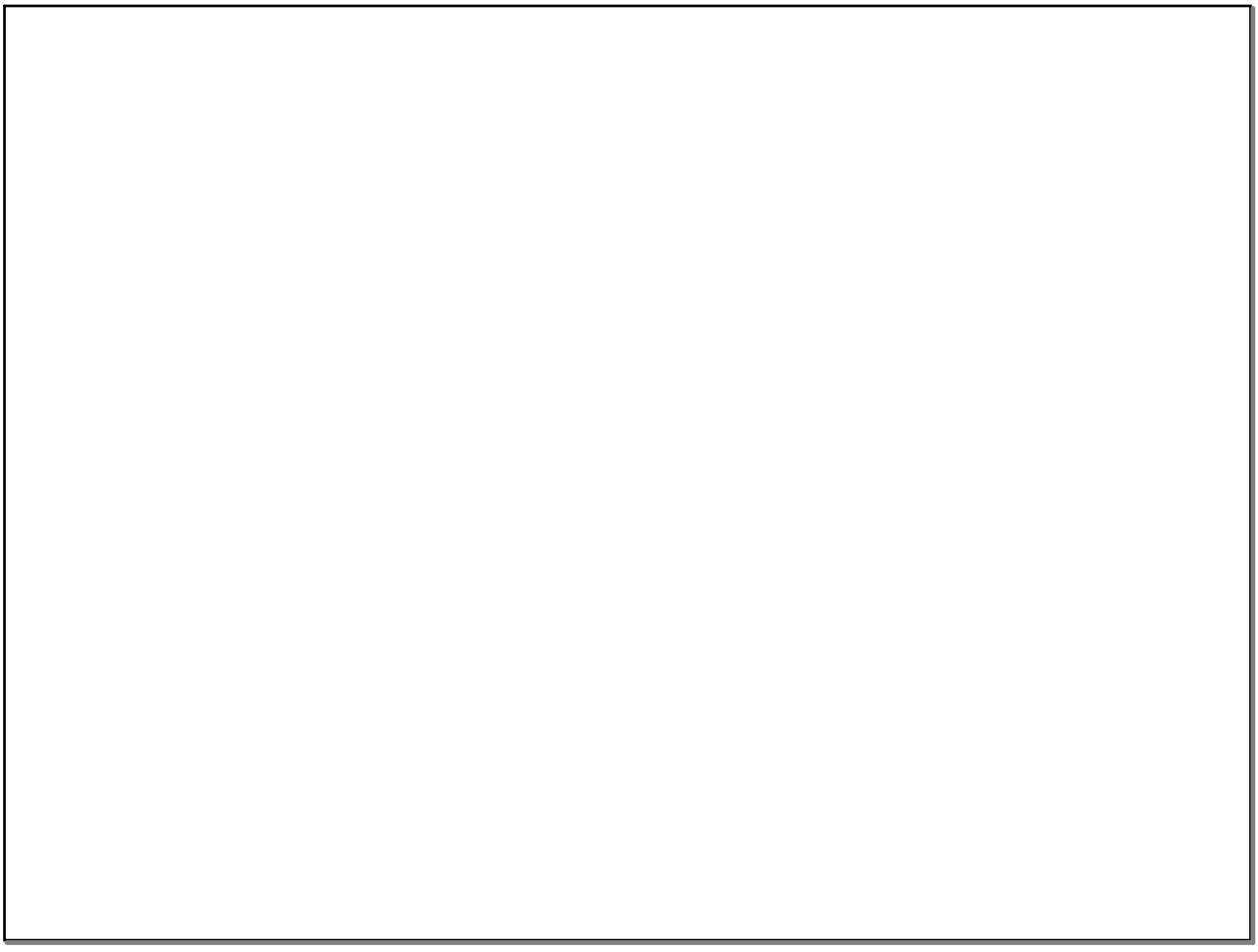
7. **Given :** $\Delta DHE \cong \Delta GHF$
Identify a precise series of rigid motions that maps ΔDHE onto ΔGHF.



8. **Given :** $\Delta JLP \cong \Delta JNK$
Identify a precise series of rigid motions that maps ΔJLP onto ΔJNK.







Attachments

4-9 & 4-12L Homework.pdf