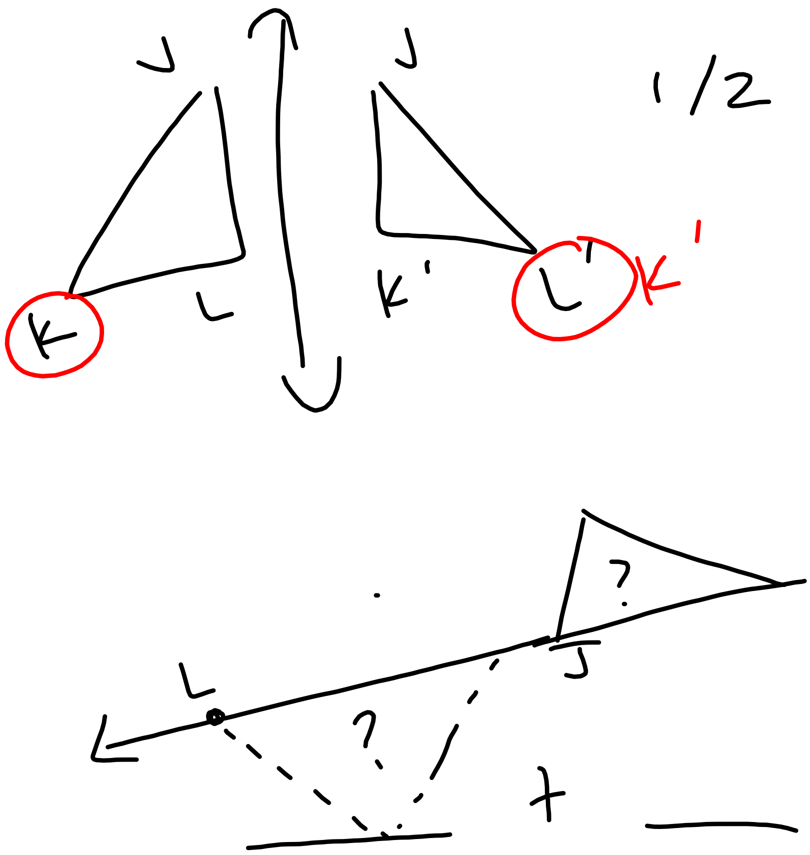
Lesson 4-9: Sequence of Rigid Motions Proofs

AGENDA:

- Homework 4-8 CPCTC Book Work Check & Review
- Lesson Notes, Guided Practice, Individual Practice

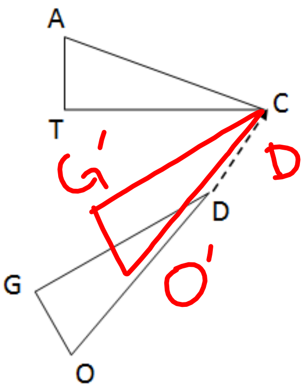
Homework:

- Problem Set in Notes
- TUESDAY (tomorrow) after school - Unit 3 Test Remediation bring your lesson summaries and test



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

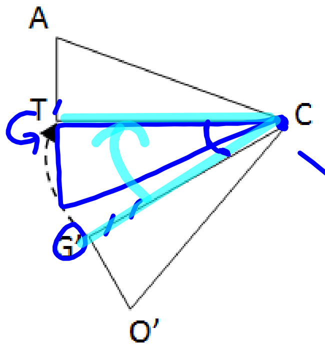


Maps D to C, O to O', and G to G'

△DOG ONTO △CAT

TRANSLATE △DOG BY VECTOR $\overrightarrow{DC}$ TO MAP D TO C, O TO O', G TO G'

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



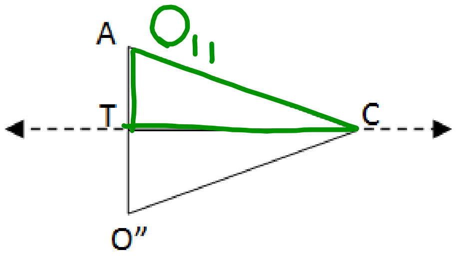
Maps C to itself, O' to O", G' to T

△DOG ONTO △CAT

ROTATE AROUND C, m∠G'CT

INVARIANT

3. Reflect over a common/shared side

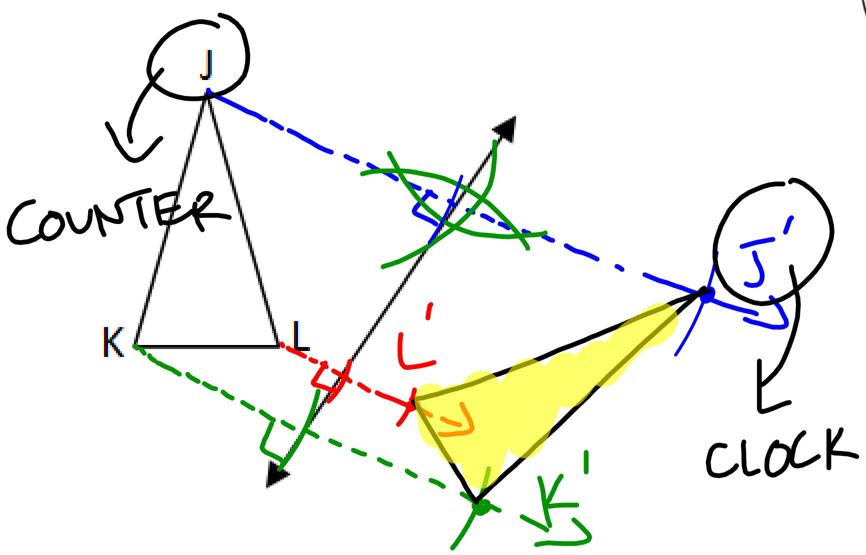


Maps C & T to themselves, O'' to A

REFLECT INTO $\overleftrightarrow{CT}$

Back when we first introduced reflections, we sketched the image over a line of reflection. So lets do a review...

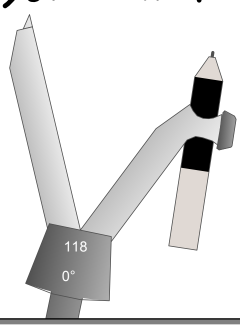
Sketch ΔJKL **over** *line* n **:**



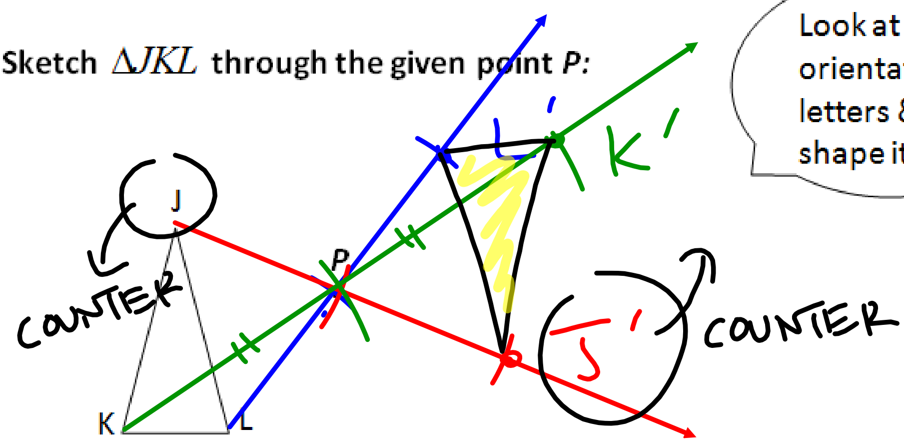
Look at the orientation of letters & the shape itself.

How do the orientations compare? CHANGED

INDIRECT ISOMETRY



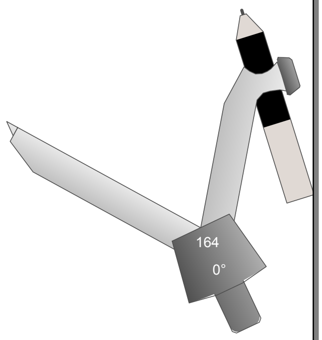
Sketch ΔJKL through the given point P:

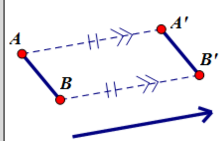
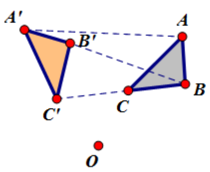
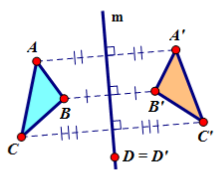
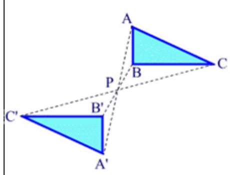


Look at the orientation of letters & the shape itself.

$= R_{180^\circ}$

NO CHANGE IN ORIENTATION



	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. 

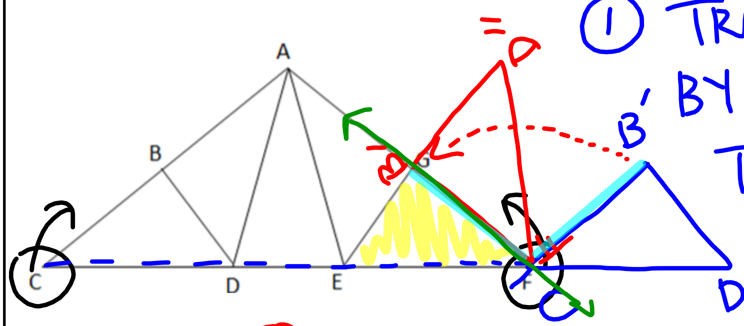
SUMMARY:

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

Examples: 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 AND state where each point/vertex maps to after each rigid motion.

1. Given: $\Delta CBD \cong \Delta FGE$
   Identify a precise series of rigid motions that maps ΔCBD onto ΔFGE.

CHANGE IN ORIENT.



① TRANSLATE ΔCBD BY VECTOR $\overrightarrow{CF}$ TO MAP C TO F, D TO D', B TO B',

② ROTATE AROUND F, $m\angle B'FG$ TO MAP F TO ITSELF, B → G, D' TO D''

③ REFLECT INTO $\overleftrightarrow{GF}$ TO MAP G & F TO THEMSELVES AND D'' TO E

Examples 2&3: For each identify the <u>precise</u> 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.

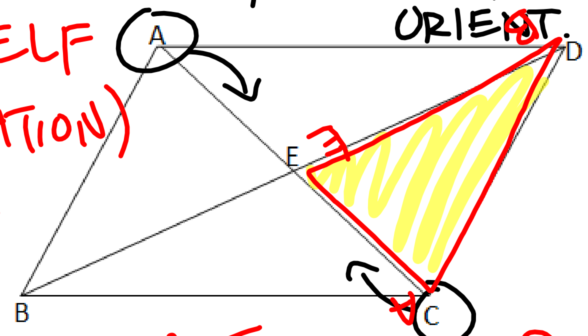
2. Given: $\Delta AEB \cong \Delta CED$

Identify a precise series of rigid motions that maps ΔAEB onto ΔCED.

NO CHANGE IN ORIENT.

E MAPS TO ITSELF (NO TRANSLATION)

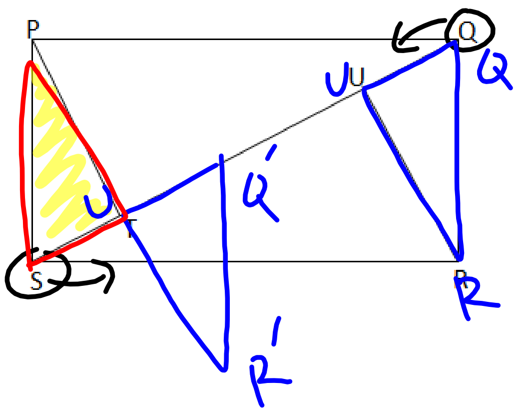
ROTATE ΔAEB AROUND E, 180° TO MAP A TO C, B TO D, E TO ITSELF



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

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

NO REFLECT INTO LINE



TRANSLATE ΔQUR BY VECTOR $\overrightarrow{UT}$ TO MAP U TO T, Q TO Q', R TO R'

ROTATE AROUND T, 180° TO MAP T TO ITSELF, R' → P, Q' → S

Attachments

4-9 & 4-12L Homework.pdf