3.4 Classification of Rigid Motion

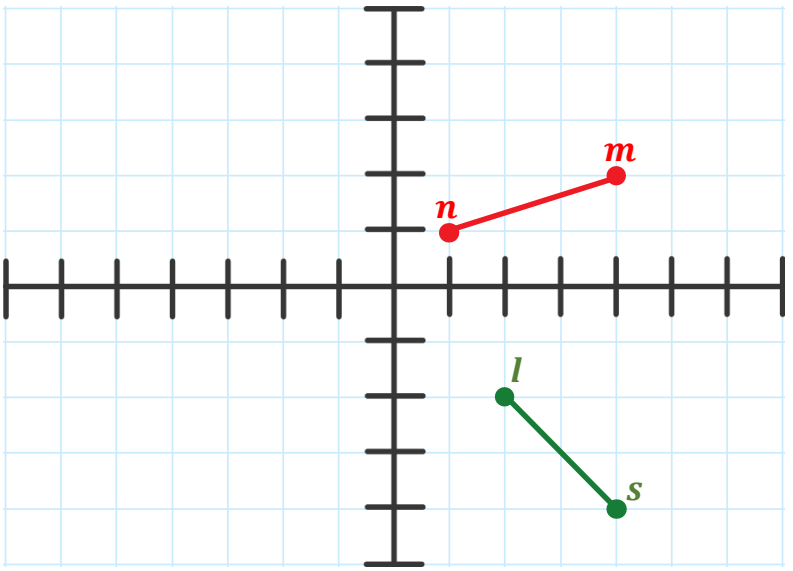
Monday, September 23, 2019 7:46 AM

Warm Up

Translat**e, Rot**ate, and/or Reflect the following images according the rules given.

$R_{x-axis} \circ T_{\langle -4,-2 \rangle}(\overline{MN})$

$T_{\langle 4,3 \rangle} \circ r_{(90°,O)}(\overline{SL})$



Essential Question

How can rigid motions be classified?

Needed Vocab:

- **Glide Reflection**

Goal: "I can. . .

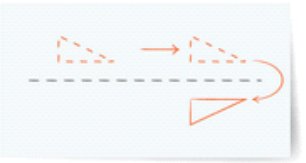
Identify different rigid motions used to transform two-dimensional shapes."

Two students are trying to determine whether compositions of rigid motions are commutative. View all of their work in the gallery of images.

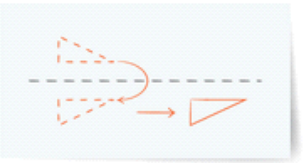
A. Should Paula have used graph paper? Explain.
B. Do you agree with Paula or Keenan? Explain.

Paula's Conclusion

Translate. Then reflect.



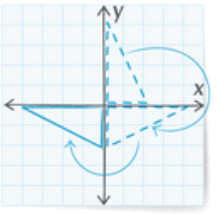
Reflect. Then translate.



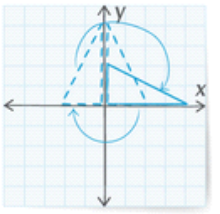
Conclusion: Compositions of rigid motions **are** commutative.

Keenan's Conclusion

Rotate. Then reflect.



Reflect. Then rotate.

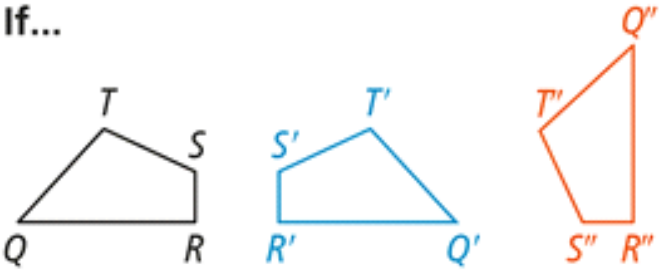


Conclusion: Compositions of rigid motions **are not** commutative.

Rigid Motion Composition

The composition of two or more rigid motions is a rigid motion.

If...



Then...

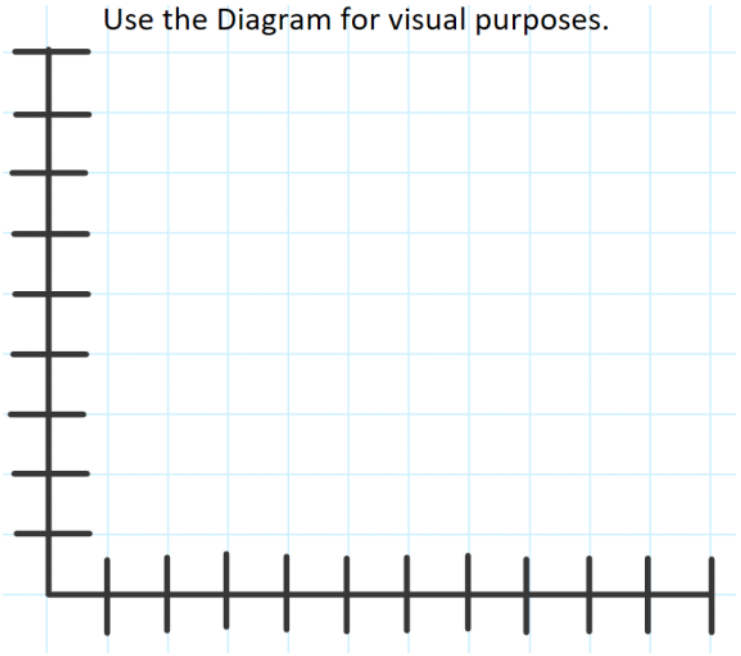
$(N \circ M)$: $QRST \rightarrow Q''R''S''T''$ is a rigid motion.

M: $QRST \rightarrow Q'R'S'T'$ and
N: $Q'R'S'T' \rightarrow Q''R''S''T''$ are rigid motions.

PROOF: SEE EXAMPLE 1.

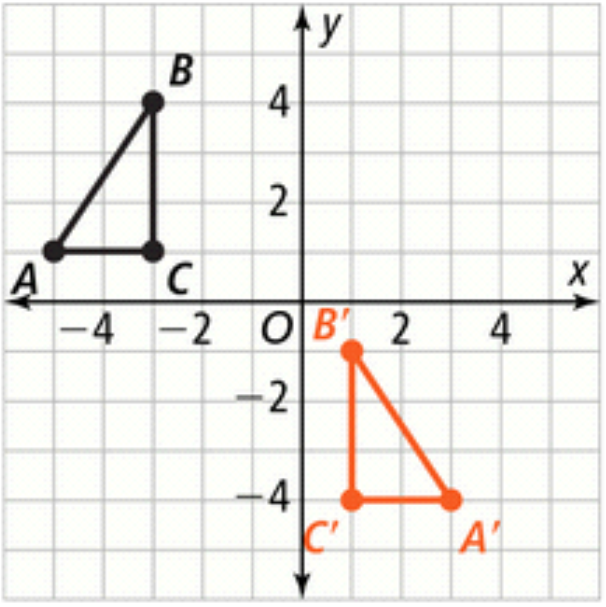
How can we **prove** that a composition of rigid motions is a rigid motion?

Use the Diagram for visual purposes.

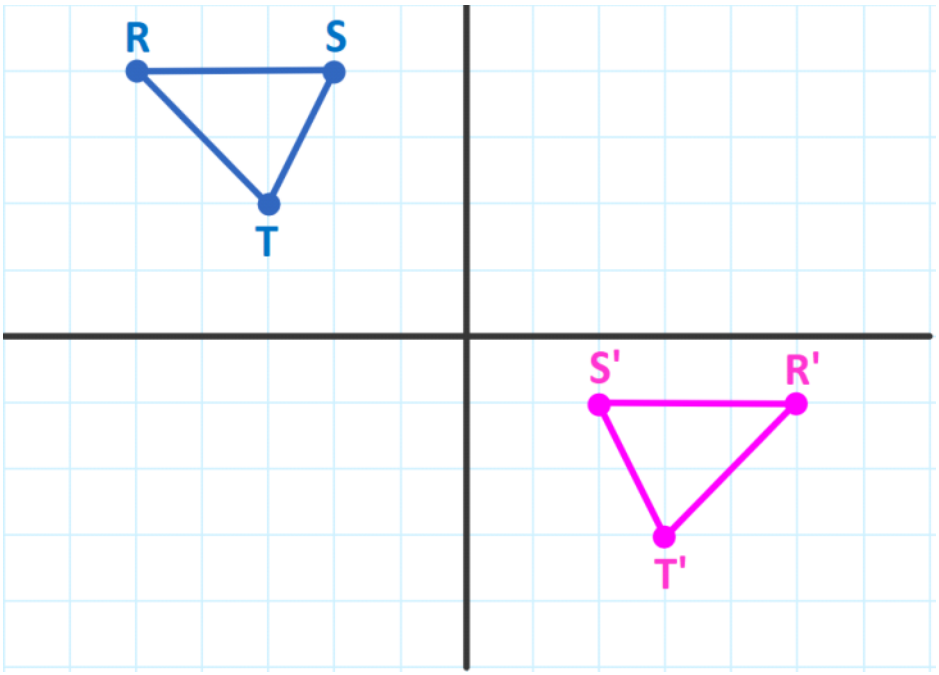


Example 1

Is there a rigid motion that maps ΔABC to ΔA'B'C'?

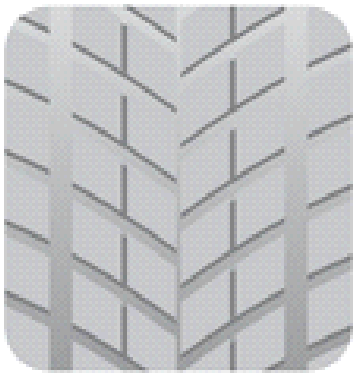


What is the glide reflection that maps ΔRST to ΔR'S'T'.



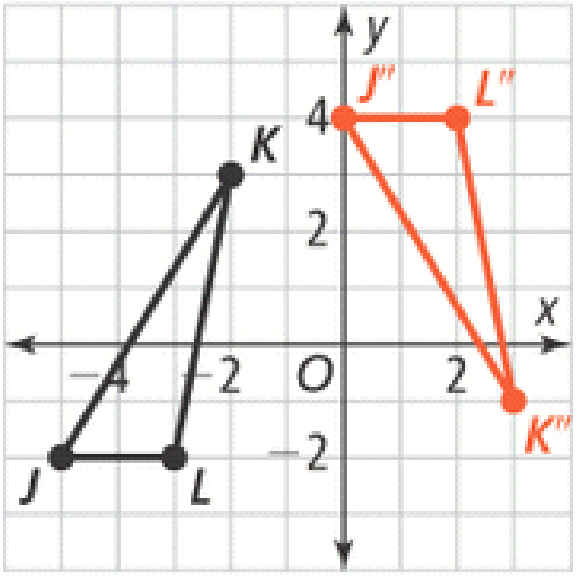
Example 2

A digital artist is reproducing a tire tread pattern from a partial tire print from a crime scene by applying a glide reflection. She uses the rule $T_{\langle 0,0.1\rangle} \circ R_{y-axis}$ to generate a pattern. Confirm that her rule can be applied to the partial pattern that was taken from the crime scene.



Quadrilateral RSTV has vertices R(-3, 2), S(0, 5), T(4, -4), V(0, -2). Use the rule $T_{\langle 1,0\rangle} \circ R_{x-axis}$ to graph and label the glide reflection of RSTV.

What is the glide reflection that maps ΔJKL to ΔJ"K"L"?

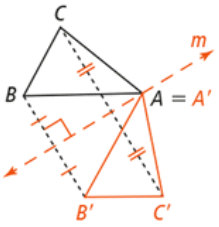


What is the glide reflection that maps the following?
ΔABC→ΔA'B'C' given:
A(-3, 4), B(-4, 2), C(-1, 1), A'(1, 1), B'(2, -1), and C'(-1, -2).

What is the glide reflection that maps the following?
$\overline{RS} \rightarrow \overline{R'S'}$ given:
R(-2, 4), S(2, 6), R'(4, 0), and S'(8, -2).

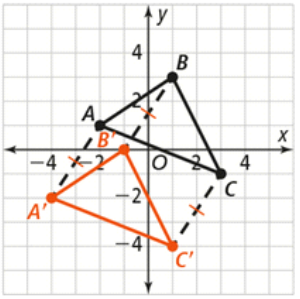
Types of Rigid Motions

REFLECTION



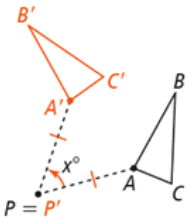
$R_m(\triangle ABC) = \triangle A'B'C'$

TRANSLATION



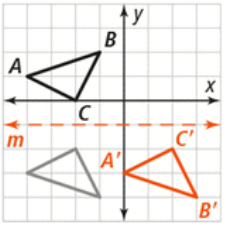
$T_{\langle -2, -3 \rangle}(\triangle ABC) = \triangle A'B'C'$

ROTATION



$r_{(x°, P)}(\triangle ABC) = \triangle A'B'C'$

GLIDE REFLECTION



$(T_{\langle 4, 0 \rangle} \circ R_m)(\triangle ABC) = \triangle A'B'C'$

Homework

Pg. 134
9, 10, 12-21, 25, 26