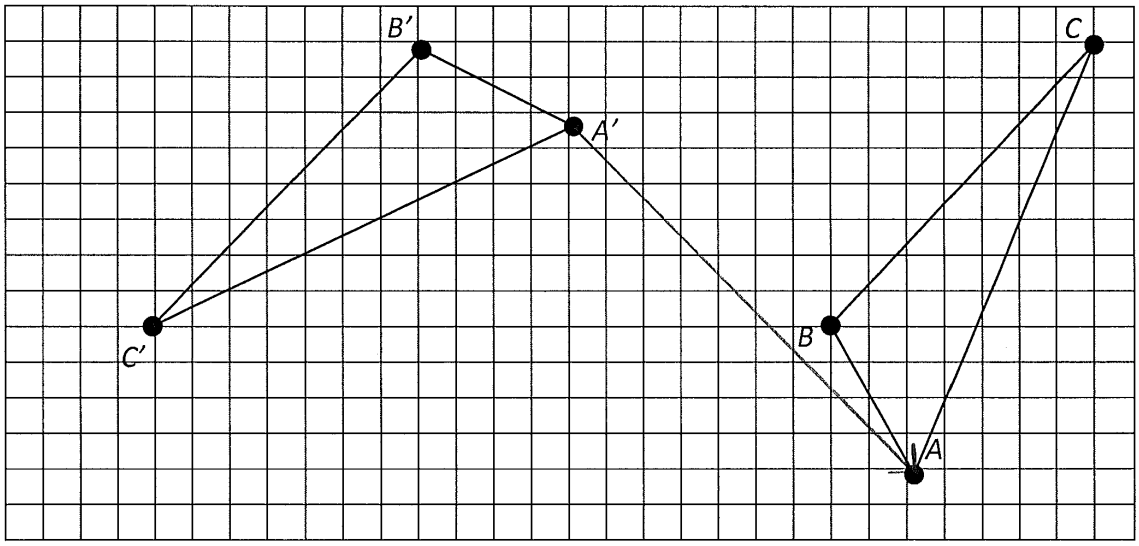
A Progression Toward Mastery					
Assessment Task Item		**STEP 1** Missing or incorrect answer and little evidence of reasoning or application of mathematics to solve the problem.	**STEP 2** Missing or incorrect answer but evidence of some reasoning or application of mathematics to solve the problem.	**STEP 3** A correct answer with some evidence of reasoning or application of mathematics to solve the problem, or an incorrect answer with substantial evidence of solid reasoning or application of mathematics to solve the problem.	**STEP 4** A correct answer supported by substantial evidence of solid reasoning or application of mathematics to solve the problem.
1	a 8.G.2	Student was unable to respond to the question or left item blank. Student answered with yes or no only. Student may or may not have answered correctly. Student shows no reasoning or application of mathematics to solve the problem.	Student answered with yes or no. Student may or may not have answered correctly. Student used little or no mathematical vocabulary or notation (e.g., map, image, prime notation, etc.) in written explanation. Some evidence mathematical reasoning used in written explanation.	Student answered correctly that one translation and one reflection will not work. Student may or may not have used mathematical vocabulary or notation (e.g., map, image, prime notation, etc.) in written explanation in attempt to translate or reflect. Some evidence mathematical reasoning used in written explanation.	Student answered correctly that one translation and one reflection will not work. Student used mathematical vocabulary and notation (e.g., map, image, prime notation, etc.) in written explanation. AND Substantial evidence mathematical reasoning used in written explanation.
	b 8.G.2	Student was unable to respond to the question or left item blank. Student did not describe a sequence. Student showed no reasoning or application of mathematics to solve the problem.	Student identified an incorrect sequence of rigid motions. Student used little or no mathematical vocabulary or notation in sequence. Some evidence mathematical reasoning used in sequence.	Student identified a correct sequence of rigid motions but lacked precision. Student may or may not have used mathematical vocabulary or notation sequence. Some evidence mathematical reasoning used in sequence.	Student identified a correct sequence of rigid motions with precision. Student used mathematical vocabulary and notation in sequence. Substantial evidence mathematical reasoning used in sequence.

2	**8.G.5**	Student was unable to respond to the questions or left items blank. Student showed no reasoning or application of mathematics to solve the problem.	Student calculated the measurement of the angle. Student may have made calculation errors. Student attempted to use auxiliary lines to solve the problem. Student showed little or no reasoning in written explanation. Student did not use any theorem in written explanation.	Student calculated the measurement of the angle. Student may have made calculation errors. Student used auxiliary lines to solve the problem. Student showed some reasoning in written explanation. Student may or may not have used the correct theorem in the written explanation.	Student calculated the measurement of the angle correctly as $73°$. Student used auxiliary lines to solve the problem. AND Student shows substantial reasoning in written explanation including information about congruent angles being equal, straight angles having $180°$, triangle sum being $180°$, sum of remote interior angles equal to exterior angle of a triangle, etc.
3	**a** **8.G.5**	Student was unable to respond to the questions or left items blank. Student shows no reasoning or application of mathematics to solve the problem.	Student may have made calculation errors. Student may have answered part of the question correctly, i.e., $\angle IHM = \angle JHN = 125°$ but omitted $\angle IHJ = \angle NHM = 55°$, OR answered with all four angles are the same measure.	Student showed some application of mathematics to solve the problem. Student may have made calculation errors. Student may have reversed the answers, i.e., $\angle IHM = \angle JHN = 55°$ or $\angle IHJ = \angle NHM = 125°$.	Student answered correctly with $\angle IHM = \angle JHN = 125°$ and $\angle IHJ = \angle NHM = 55°$ for measures of ALL four angles.
	b **8.G.5**	Student was unable to respond to the questions or left items blank. Student showed no reasoning or application of mathematics to solve the problem. Student did not include a written explanation.	Student may have answered the name of the angles incorrectly. Student may have identified incorrectly the other angles with the same relationship. Student included a written explanation. Student referenced a rigid motion, translation, rotation, reflection. Written explanation is not mathematically based, i.e., "they look the same."	Student may have answered the name of the angles incorrectly but did identify correctly the other angles with the same relationship. Student used some mathematical vocabulary in written explanation. Student referenced rotation but may not have referenced all of the key points in written explanation.	Student answered correctly by calling the angles Alternate Interior Angles. AND Student named $\angle 3$ and $\angle 5$ as angles with the same relationship. AND Student used mathematical vocabulary in written explanation. AND Student referenced ALL of the following key points: N is the midpoint of HG, rotation of $180°$ around N, and rotation is degree preserving ine written explanation. Written explanation is thorough and complete.

	c **8.G.5**	Student was unable to respond to the questions or left items blank. Student showed no reasoning or application of mathematics to solve the problem. Student did not include a written explanation.	Student may have answered the name of the angles incorrectly. Student may have identified incorrectly the other angles with the same relationship. Student included a written explanation. Student referenced a rigid motion, translation, rotation, reflection. Written explanation is not mathematically based, i.e. "they look the same."	Student may have answered the name of the angles incorrectly but did identify correctly the other angles with the same relationship. Student used some mathematical vocabulary in written explanation. Student referenced translation but may not have referenced all of the key points in written explanation.	Student answered correctly by calling the angles Corresponding Angles. Student named $\angle 2$ and $\angle 6$ (or $\angle 3$ and $\angle 7$ or $\angle 4$ and $\angle 8$) as angles with the same relationship. AND Student used mathematical vocabulary in written explanation. AND Student referenced ALL of the following key points: translation along vector HG, translation maps parallel lines to parallel lines, and translation is degree preserving in written explanation. Written explanation is thorough and complete.

Name _____ Date _____

1. $\Delta ABC \cong \Delta A'B'C'$. Use the picture below to answer parts (a) and (b).



a. Is it possible to show a congruence between ΔABC and $\Delta A'B'C'$ using only one translation and one reflection? If so, explain how.

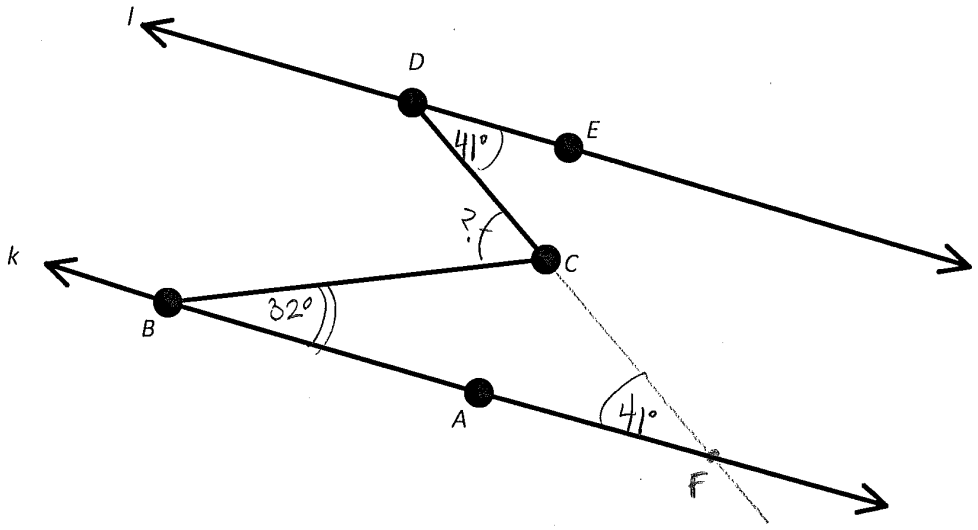
NO. A TRANSLATION CAN MAP A' TO A BUT A REFLECTION WILL NOT MAP $\Delta A'B'C'$ TO ΔABC.

b. Describe a sequence of rigid motions that would prove a congruence between ΔABC and $\Delta A'B'C'$.

LET T BE THE TRANSLATION ALONG $\overrightarrow{A'A}$ SO THAT $T(A')=A$.
LET R BE THE ROTATION AROUND A, d DEGREES SO THAT $R(A'B')=AB$. BY HYPOTHESIS $|AB|=|A'B'|$.
LET Λ BE THE REFLECTION ACROSS L_{AB}. AGAIN BY HYPOTHESIS $|\angle A|=|\angle A|$, $|\angle B|=|\angle B|$, SO THE COMPOSITION $\Lambda \circ R \circ T$ WILL MAP $\Delta A'B'C'$ TO ΔABC, ie., $\Lambda(R(T(\Delta A'B'C')))=\Delta ABC$

2. Use the diagram to answer the question below.

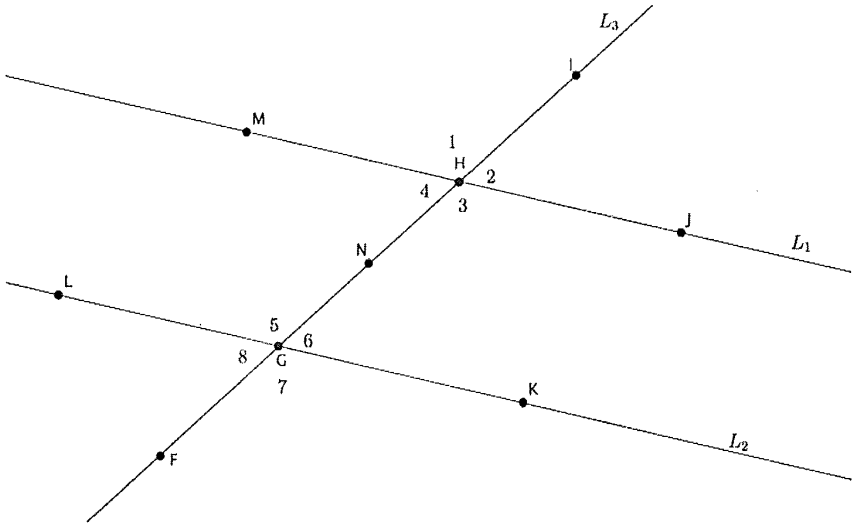
$k \| l$



Line *k* is parallel to line *l*. $m\angle EDC = 41^\circ$ and $m\angle ABC = 32^\circ$. Find the $m\angle BCD$. Explain in detail how you know you are correct. Add auxiliary lines and points as needed for your explanation.

LET F BE A POINT ON LINE k SO THAT ∠DCF IS A STRAIGHT ANGLE. THEN BECAUSE k // l, ∠EDC ≅ ∠CFA AND HAVE EQUAL MEASURE. ∠ABC AND ∠CFA ARE THE REMOTE INTERIOR ANGLES OF Δ BCF WHICH MEANS ∠BCD = ∠ABC + CFA. THEREFORE ∠BCD = 32 + 41 = 73°.

3. Use the diagram below to answer the questions that follow. Lines L_1 and L_2 are parallel, $L_1 \| L_2$. Point *N* is the midpoint of segment *GH*.



a) If $\angle IHM = 125^\circ$. what is the measure of $\angle IHJ$? $\angle JHN$? $\angle NHM$?

$\angle IHJ = 55^\circ$ $\angle JHN = 125^\circ$ $\angle NHM = 55^\circ$

b) What can you say about the relationship between $\angle 4$ and $\angle 6$? Explain using a basic rigid motion. Name another pair of angles with this same relationship.

$\angle 4$ & $\angle 6$ ARE ALTERNATE INTERIOR ANGLES THAT ARE EQUAL BECAUSE $L_1 // L_2$. LET R BE A ROTATION OF 180° AROUND POINT N. THEN $R(N) = N$, $R(L_3) = L_3$, AND $R(L_1) = L_2$. ROTATIONS ARE DEGREE PRESERVING SO $R(\angle 4) = \angle 6$.

$\angle 3$ & $\angle 5$ ARE ALSO ALTERNATE INTERIOR ANGLES THAT ARE EQUAL.

c) What can you say about the relationship between $\angle 1$ and $\angle 5$? Explain using a basic rigid motion. Name another pair of angles with this same relationship.

$\angle 1$ & $\angle 5$ ARE CORRESPONDING ANGLES THAT ARE EQUAL BECAUSE $L_1 // L_2$. LET T BE THE TRANSLATION ALONG VECTOR $\overrightarrow{GH}$. THEN $T(L_2) = L_1$ AND $T(\angle 5) = \angle 1$.

$\angle 3$ & $\angle 7$ ARE ALSO CORRESPONDING ANGLES THAT ARE EQUAL.