## Lesson 10: Conditions for a Unique Triangle-Two Angles and a

## Given Side

## Classwork

## Exploratory Challenge

1. A triangle $\triangle X Y Z$ has angles $\angle X=30^{\circ}$ and $\angle Y=50^{\circ}$ and included side $X Y=6 \mathrm{~cm}$. Draw triangle $\triangle X^{\prime} Y^{\prime} Z^{\prime}$ under the same condition as $\triangle X Y Z$. Leave all construction marks as evidence of your work, and label all side and angle measurements.

Under what condition is $\Delta X^{\prime} Y^{\prime} Z^{\prime}$ drawn? Compare the triangle you drew to two of your peers' triangles. Are the triangles identical? Did the condition determine a unique triangle? Use your construction to explain why.
2. A triangle $\triangle R S T$ has angles $\angle S=90^{\circ}$ and $\angle T=45^{\circ}$ and included side $S T=7 \mathrm{~cm}$. Draw triangle $\triangle R^{\prime} S^{\prime} T^{\prime}$ under the same condition. Leave all construction marks as evidence of your work, and label all side and angle measurements.
Under what condition is $\Delta R^{\prime} S^{\prime} T^{\prime}$ drawn? Compare the triangle you drew to two of your peers' triangles. Are the triangles identical? Did the condition determine a unique triangle? Use your construction to explain why.
3. A triangle $\triangle J K L$ has angles $\angle J=60^{\circ}$ and $\angle L=25^{\circ}$ and side $K L=5 \mathrm{~cm}$. Draw triangle $\triangle J^{\prime} K^{\prime} L^{\prime}$ under the same condition. Leave all construction marks as evidence of your work, and label all side and angle measurements.
Under what condition is $\Delta J^{\prime} K^{\prime} L^{\prime}$ drawn? Compare the triangle you drew to two of your peers' triangles. Are the triangles identical? Did the condition determine a unique triangle? Use your construction to explain why.
4. A triangle $\triangle A B C$ has angles $\angle C=35^{\circ}$ and $\angle B=105^{\circ}$ and side $A C=7 \mathrm{~cm}$. Draw triangle $\triangle A^{\prime} B^{\prime} C^{\prime}$ under the same condition. Leave all construction marks as evidence of your work, and label all side and angle measurements. Under what condition is $\Delta A^{\prime} B^{\prime} C^{\prime}$ drawn? Compare the triangle you drew to two of your peers' triangles. Are the triangles identical? Did the condition determine a unique triangle? Use your construction to explain why.

## Problem Set

1. In triangle $\triangle F G H, \angle F=42^{\circ}$ and $\angle H=70^{\circ}$. Side $F H=6 \mathrm{~cm}$. Draw triangle $\Delta F^{\prime} G^{\prime} H^{\prime}$ under the same condition as $\triangle F G H$. Leave all construction marks as evidence of your work, and label all side and angle measurements. What can be concluded about $\triangle F G H$ and $\Delta F^{\prime} G^{\prime} H^{\prime}$ ? Justify your response.
2. In triangle $\triangle W X Y, \angle Y=57^{\circ}$ and $\angle W=103^{\circ}$. Side $Y X=6.5 \mathrm{~cm}$. Draw triangle $\triangle W^{\prime} X^{\prime} Y^{\prime}$ under the same condition as $\triangle W X Y$. Leave all construction marks as evidence of your work, and label all side and angle measurements. What can be concluded about $\triangle W X Y$ and $\Delta W^{\prime} X^{\prime} Y^{\prime}$ ? Justify your response.
3. $A, Z$, and $E$ are collinear, and $\angle B=\angle D$. What can be concluded about $\triangle A B Z$ and $\triangle E D Z$ ? Justify your answer.
4. Draw $\triangle A B C$ so that $\angle A$ has a measurement of $60^{\circ}, \angle B$ has a measurement of $60^{\circ}$, and $A B$ has a length of 8 cm . What are the lengths of the other sides?
5. Draw $\triangle A B C$ so that $\angle A$ has a measurement of $30^{\circ}, \angle B$ has a measurement of $60^{\circ}$, and $B C$ has a length of 5 cm . What is the length of the longest side?
