



Angles and Similarity

Student Activity

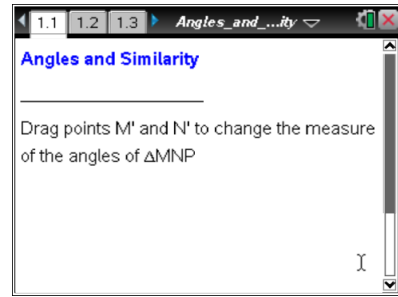


Name _____

Class _____

Open the TI-Nspire document *Angles_and_Similarity.tns*.

In this activity, $\triangle ABC$ and $\triangle MNP$ have been constructed. $\triangle ABC$ will not change during this exploration. $\triangle MNP$ has been constructed so that moving points M' and N' will change the measures of $\angle M$, $\angle N$, and $\angle P$. You will investigate the relationship between $\triangle ABC$ and $\triangle MNP$.



Move to page 1.2.

1. Drag points M' and N' until $m\angle M = m\angle A$ and $m\angle N = m\angle B$. What changes when you move these points?

2. Drag points M' and N' until $m\angle M = m\angle A$ and $m\angle N = m\angle B$.

a. Record the angle measures for each of the angles below:

$$m\angle M = \underline{\hspace{2cm}} \quad m\angle N = \underline{\hspace{2cm}} \quad m\angle P = \underline{\hspace{2cm}}$$

b. What do you notice about the relationship of $m\angle P$ and $m\angle C$?

3. a. Drag points M' and N' until $\angle M$ and $\angle N$ are congruent to two corresponding angles in $\triangle ABC$ that are different than the angles identified in question 2a. Record the angle congruence for each of the angles below:

$$m\angle M = \underline{\hspace{2cm}} \quad m\angle N = \underline{\hspace{2cm}} \quad m\angle P = \underline{\hspace{2cm}}$$

b. How many different ways can this be done? List any other possibilities and justify your answer.

4. Keep in mind that two angles are **congruent** if and only if they have the same measure.

If two triangles have two pairs of angles that are congruent, what can you conclude about the third pair of angles? Give a mathematical argument for your conclusion.

5. Why would your triangles in question 3 be described as similar, but not congruent?

**Move to page 1.3.**

6. Drag points M' and N' until $\angle M \cong \angle A$ and $\angle N \cong \angle B$.
- What additional information is given when the corresponding angle measures are equal to each other?
 - What is significant about this information?
 - After completing questions 6a and 6b, Frank concludes that $\triangle ABC \sim \triangle NPM$. Is his reasoning correct? Explain why or why not.
7. Knowing two pairs of corresponding angles are congruent leads to proportional sides. When you know the ratio of similarity and a side in one triangle, you can use it to find the measure of the corresponding side in the other triangle.
- Drag M' and N' until $m\angle M = 35^\circ$ and $m\angle N = 60^\circ$.
What is the ratio of similarity shown on the sketch? '
Which side of $\triangle ABC$ corresponds to \overline{MN} ?
If $\overline{MN} = 8$, find the length of the corresponding side. Show your work.
 - Drag M' and N' until $m\angle M = 35^\circ$ and $m\angle N = 85^\circ$.
What is the ratio of similarity shown on the sketch?
Which side of $\triangle MNP$ corresponds to \overline{BC} ?
If $BC = 2$, find the length of the corresponding side. Show your work.



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8. Terry and Jessica created three right triangles shown on the screen on the right. Terry claims that all the right triangles are similar because they all have a right angle.

Jessica says that you also need to know that the measures of a pair of corresponding acute angles are congruent before you can conclude that any two of the right triangles are similar.

Who is right? Explain your answer.

