Special Right Triangles

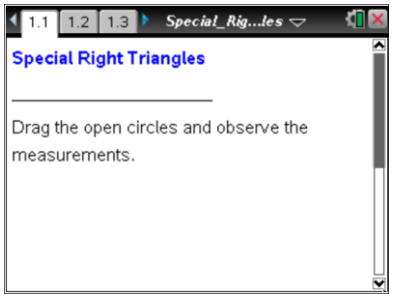
Student Activity

Name _____

Class _____

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

This activity asks you to examine two types of special right triangles and determine the relationships between the lengths of their legs and hypotenuse.



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1. $\triangle ABD$ is an equilateral triangle. Drag point *B* or *D*.

   a. What kind of triangle is $\triangle ABC$? What are its angle measures? How do you know?

   b. What do you observe about *AB* and *CB*? Write an equation showing the relationship.

   c. Given the measures for *AB* and *CB*, how can the exact value of *AC* be calculated?

2. Drag point *B* to get the values of *CB* given in the table. Record the missing measures of *AB* and *AC* (use the Pythagorean Theorem to calculate and record exact values for *AC*). Write the ratio for the fourth column.

AB (hypotenuse)	*CB* (shorter leg)	*AC* (longer leg)	$\frac{AB}{CB}$
	2		
	3		
	4		

3. Examine the table from question 2.

   a. What do you observe about *CB* and *AC*? Test your observation using another length of $\overline{CB}$.

   b. Write an equation showing the relationship between *CB* and *AC* from your observations.

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4. Grab point *B* or *D* and use ◀ and ▶ to move it.

   a. What do you observe about the calculation and the measure of *AC?* Does this confirm or disprove your equation in question 3b?

   b. Describe the special right triangle in this investigation and express relationships that always exist among the shorter leg, longer leg, and hypotenuse.

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5. △*ABC* is half of a square. Drag point *C*.

   a. What kind of triangle is △*ABC*? What are its angle measures? How do you know?

   b. What do you observe about *AB* and *CB?* Write an equation showing the relationship.

6. Drag point *C* to get the values of *CB* given in the table. Record the missing measures of *AB* and *AC* (use the Pythagorean Theorem to calculate and record exact values for *AC*). Write the ratio for the fourth column.

AB (leg)	*CB* (leg)	*AC* (hypotenuse)	$\frac{AC}{CB}$
	2		
	3		
	4		

7. Examine the table in question 6.

   a. What do you observe about *CB* and *AC?* Test your observation using another length of $\overline{CB}$.

   b. Write an equation showing the relationship between *CB* and *AC* from your observations.

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8. Drag point *C*.

   a. What do you observe about the calculation and the measure of *AC*? Does this confirm or disprove your equation in question 7b?

   b. Describe the special right triangle in this investigation and express relationships that always exist among the legs and hypotenuse.