**Activity 4.7.2 Special Right Triangles Discovery**

1. **Warm up:** Find the missing side lengths in the right triangles below. Leave your answer as a simplified square root.



a. b.

2**. 45 o - 45 o - 90 o Right Triangles**



1. Use the square dot paper to draw an isosceles right triangle with legs that are 3 units long. Find the length of the hypotenuse. Then simplify the square root.
2. Draw an isosceles right triangle with different leg lengths than above and find the length of the hypotenuse. Then simplify the square root.
3. Compare your answer in (b) to a classmate. What do you notice about the relationship of the legs of an isosceles right triangle to its hypotenuse?
4. Label each side length of the 45o- 45 o- 90o triangles below.



**In the previous activity you learned there is a special ratio relationship of the legs to the hypotenuse in a 45o - 45 o- 90 o triangle. We are now going to explore another special relationship with 30 o- 60 o- 90 o triangles.**

**30 o - 60 o - 90 o Right Triangles**

3. Use the isometric dot paper to draw an equilateral triangle with side lengths of 4-4-4.

1. What do you know about the angles of an equilateral triangle?
2. Draw an altitude from a vertex to one side. Label all of the angles and the side lengths of your triangle(s).
3. You now have two congruent triangles. What are the angles of the triangles?
4. Find the missing leg of the triangle and leave as a simplified square root.
5. Repeat the above steps for a 6-6-6 triangle.
6. What conjecture can you make about the hypotenuse of a 30o - 60 o - 90 o triangle when compared to the short leg?
7. What conjecture can you make about the long leg of a 30o - 60 o - 90 o triangle when compared to the short leg?
8. Find the missing side lengths. Leave the missing side in simplified form where applicable.

 a. b. c.



6.In the figure at the right, *A* is on  and AB = 10 cm. Find each length as an exact value.

Show all your steps and explain your reasoning.

* 1. *BC* = \_\_\_\_\_\_\_\_
	2. *AC* = \_\_\_\_\_\_\_\_
	3. *BD* = \_\_\_\_\_\_\_\_
	4. *AD =*  \_\_\_\_\_\_\_\_