

Chapter 9- Lesson 1

Special Right Triangles

Goals

Develop an understanding and ability to apply relationships inherent in special right triangles.

What is the key question for this lesson?

Half of a Square

1. Making a model:
 - a) Take a piece of paper and make a square (≥ 4 inches on a side)— measure, cut.
 - b) Fold the square diagonally.
 - c) What kind of triangles have you formed?
2. Suppose the side of the square you made in (1) was 5 inches. What would be the length of the diagonal, simplify your result (no calculators!). Justify by showing clear work.
3. Given Side, Find Diagonal
Find the length of the diagonal of a square with the following length sides. Look for patterns! Justify by showing clear work.
 - a. 4
 - b. 2
 - c. 1
 - d. x

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4. Given Diagonal, Find Side

Find the length of the side of a square with the following length diagonals. Look for patterns. Justify by showing clear work.

a. 4

b. 2

c. 1

d. x

5. Describe a fast way to **find the length** of the **diagonal** of a square when you know the length of the side.

6. Describe a fast way to **find the length** of the **side** of a square when you know the length of its diagonal.

Dividing with Radicals

When dealing with division and radicals, you will need to “rationalize the denominator”. Rationalizing the denominator is the process by which a fraction is rewritten so that the denominator does not contain a radical. Below is an example. The key step is multiplying by 1 which eliminates the radical in the denominator.

$$\begin{aligned}\frac{\sqrt{8}}{\sqrt{5}} &= \frac{\sqrt{8}}{\sqrt{5}} && \text{Rewrite} \\ &= \frac{\sqrt{8}}{\sqrt{5}} \cdot 1 && \text{Multiply by 1} \\ &= \frac{\sqrt{8}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} && \text{Multiply by "1"} \\ &= \frac{\sqrt{40}}{\sqrt{25}} && \text{Simplify} \\ &= \frac{\sqrt{4}\sqrt{10}}{\sqrt{25}} && \text{Factor largest perfect square} \\ &= \frac{2\sqrt{10}}{5} && \text{Final result}\end{aligned}$$

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10. Given Short Leg, Find Hypotenuse and Long Leg

Find the length of the hypotenuse and long-leg of these 30-60-90 triangles using the following lengths for the short leg. Justify by showing clear work.

a. 4

b. 2

c. 1

d. x

11. Given Long Leg, Find Hypotenuse and Short Leg

Find the length of the short leg and hypotenuse of these 30-60-90 triangles given the length of the long leg. Justify by showing clear work.

a. 4

b. 2

c. 1

d. x

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12. Write directions for **finding** the length of the **short leg** and **long leg** of a 30-60-90 triangle when you know the length of the hypotenuse.

13. Write directions for **finding** the length of the **hypotenuse** and **long-leg** of a 30-60-90 triangle when you know the length of the short leg.

14. Write directions for **finding** the length of the **short leg** and **hypotenuse** of a 30-60-90 triangle when you know the length of the long leg.

15. Summary Chart- Complete the following in terms of the given variable.

Half of a Square Isosceles Right Triangle (45° - 45° - 90°)		
leg 1	leg 2	hypotenuse
x		
	x	
		x

Half of an Equilateral Triangle Thirty-Sixty-Ninety (30° - 60° - 90°)		
short leg	long leg	hypotenuse
x		
	x	
		2x