

# Special Right Triangles Practice

Name: \_\_\_\_\_

Date: \_\_\_\_\_

QUICK REFERENCE

**45°-45°-90°:**      $x : x : x\sqrt{2}$

45° triangle: leg, leg, hypotenuse

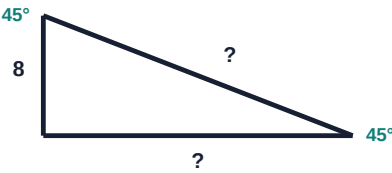
**30°-60°-90°:**      $x : x\sqrt{3} : 2x$

30° triangle: short leg, long leg, hypotenuse

LEVEL 1 · RECOGNIZE THE RATIOS

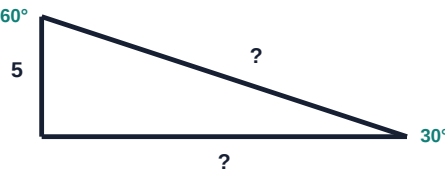
1     45°-45°-90°

Find the two missing side lengths.



2     30°-60°-90°

The short leg is 5. Find the long leg and hypotenuse.



3     45°-45°-90°

The hypotenuse is  $12\sqrt{2}$ . Find the length of each leg.

\_\_\_\_\_

\_\_\_\_\_

LEVEL 2 · FIND MISSING SIDES

4     30°-60°-90°

The hypotenuse is 18. Find both legs.

\_\_\_\_\_

\_\_\_\_\_

5     30°-60°-90°

The long leg is  $7\sqrt{3}$ . Find the short leg and hypotenuse.

\_\_\_\_\_

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## LEVEL 2 · FIND MISSING SIDES

6  $45^\circ$ - $45^\circ$ - $90^\circ$ 

The hypotenuse is 10. Find each leg in simplified radical form.

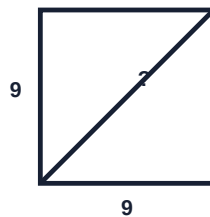
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## LEVEL 3 · APPLY SPECIAL RIGHT TRIANGLES

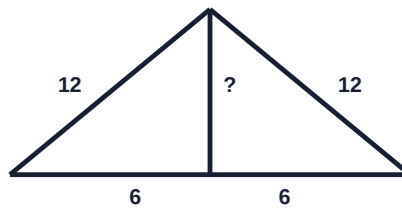
7 SQUARE DIAGONAL

A square has side length 9. Find the length of its diagonal.

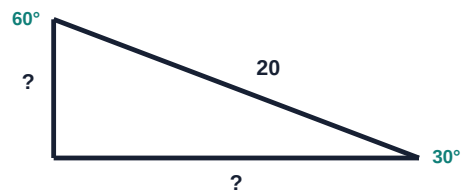


8 EQUILATERAL TRIANGLE

An equilateral triangle has side length 12. Find its height.



9 MIXED RECOGNITION

A right triangle has a  $30^\circ$  angle and hypotenuse 20. Find both legs.

## CHECK BEFORE YOU FINISH

Identify the triangle. • Match the known side. • Solve for x. • Simplify radicals.

Keep exact values unless a decimal approximation is specifically requested.

Use the work shown to check the ratio, setup, and exact radical values.

**1     45°-45°-90°**

Ratio:  $x : x : x\sqrt{2}$ . With  $x = 8$ , the other leg is 8.

**Answer: 8 and  $8\sqrt{2}$**

**2     30°-60°-90°**

Ratio:  $x : x\sqrt{3} : 2x$ . With  $x = 5$ , long leg =  $5\sqrt{3}$ .

**Answer:  $5\sqrt{3}$  and 10**

**3     45°-45°-90°**

$x\sqrt{2} = 12\sqrt{2}$ , so  $x = 12$ . Both legs are equal.

**Answer: 12 and 12**

**4     30°-60°-90°**

$2x = 18$ , so  $x = 9$ . Long leg =  $9\sqrt{3}$ .

**Answer: 9 and  $9\sqrt{3}$**

**5     30°-60°-90°**

$x\sqrt{3} = 7\sqrt{3}$ , so  $x = 7$ . Hypotenuse =  $2x$ .

**Answer: 7 and 14**

**6     45°-45°-90°**

$x\sqrt{2} = 10$ , so  $x = 10/\sqrt{2} = 5\sqrt{2}$ .

**Answer:  $5\sqrt{2}$  and  $5\sqrt{2}$**

**7     Square diagonal**

The diagonal forms a 45°-45°-90° triangle with legs 9 and 9.

**Answer:  $9\sqrt{2}$**

**8     Equilateral triangle**

The altitude splits the base into 6 and 6, creating a 30°-60°-90° triangle.

**Answer:  $6\sqrt{3}$**

**9     Mixed recognition**

$2x = 20$ , so  $x = 10$ . The long leg is  $x\sqrt{3}$ .

**Answer: 10 and  $10\sqrt{3}$**