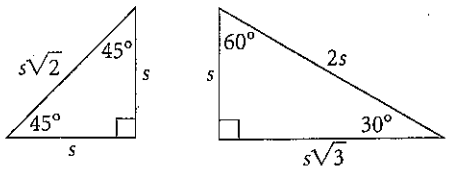
Special Right Triangles Key

FOR USE WITH LESSON 13-2

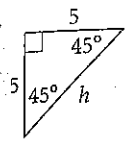
In Geometry you learned about two special right triangles, the 45°-45°-90° triangle and the 30°-60°-90° triangle. The figures at the right summarize the relationships among the lengths of the sides of each triangle.



1 EXAMPLE Finding Side Lengths in a 45°-45°-90° Triangle

Find the missing side lengths in each figure.

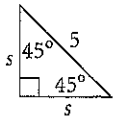
a.



$h = \sqrt{2} \cdot 5$ **hypotenuse = $\sqrt{2}$ · leg**

$h = 5\sqrt{2}$ **Simplify.**

b.



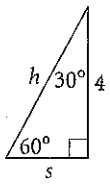
$5 = \sqrt{2} \cdot s$

$s = \frac{5}{\sqrt{2}}$

$s = \frac{5\sqrt{2}}{2}$

2 EXAMPLE Finding Side Lengths in a 30°-60°-90° Triangle

Find the missing side lengths in the triangle at the right.



$4 = \sqrt{3} \cdot s$ **longer leg = $\sqrt{3}$ · shorter leg**

$\frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$ **Divide and simplify.**

$h = 2s$ **hypotenuse = 2 · shorter leg**

$= 2 \cdot \frac{4\sqrt{3}}{3} = \frac{8\sqrt{3}}{3}$ **Substitute $\frac{4\sqrt{3}}{3}$ for s and simplify.**

EXERCISES

Use the given information to find the missing side length(s) in each 45°-45°-90° triangle. Rationalize any denominators. 1–4. See right.

1. hypotenuse 1 in.
2. leg 2 cm
3. hypotenuse $\sqrt{3}$ ft
4. leg $2\sqrt{5}$ m

Use the given information to find the missing side lengths in each 30°-60°-90° triangle. Rationalize any denominators. 5–13. See margin.

5. shorter leg 3 in.
6. longer leg 1 cm
7. hypotenuse 1 ft
8. shorter leg $\sqrt{3}$ cm
9. hypotenuse $2\sqrt{2}$ ft
10. longer leg $2\sqrt{3}$ in.
11. hypotenuse $3\sqrt{2}$ m
12. longer leg $\sqrt{5}$ cm
13. shorter leg $\sqrt{13}$ mm

Special Right Triangles

Students review the special r triangles from geometry in preparation for learning abc the unit circle and the defin of trigonometric functions.

Resources

Technology

Computer Test Item Generat CD-ROM, Chapter 0, Geometry and Measurer

Teaching Notes

1 EXAMPLE Teaching Tip

Remind students that the hypotenuse is always the lor side of a right triangle.

2 EXAMPLE Error Prevent

Suggest to students that, as memory aid and in order to prevent confusing these two special triangles, they recorc two special right triangles ir notebooks. Then they can re them in the future for probl involving special triangles.

Connection to Algebra

Remind students that they a rationalizing the denominat the second step in Example Rationalizing the denomina means multiplying by 1, her in order that roots appear o the numerator.

1. $\frac{\sqrt{2}}{2}$ in.
2. $2\sqrt{2}$ cm
3. $\frac{\sqrt{6}}{2}$ ft
4. $2\sqrt{10}$ m
10. shorter leg: 2 in., hypotenuse: 4 in.
11. shorter leg: $\frac{3\sqrt{2}}{2}$ m, longer leg: $\frac{3\sqrt{6}}{2}$ m
12. shorter leg: $\frac{\sqrt{15}}{3}$ cm, hypotenuse: $\frac{2\sqrt{15}}{3}$ cm
13. hypotenuse: $2\sqrt{13}$, longer leg: $\sqrt{39}$

5. h nuse: 6 in., longer leg: $3\sqrt{3}$ in.
6. shorter leg: $\frac{\sqrt{3}}{3}$ cm, hypotenuse: $\frac{2\sqrt{3}}{3}$ cm
7. shorter leg: $\frac{1}{2}$ ft, longer leg: $\frac{\sqrt{3}}{2}$ ft
8. hypotenuse: $2\sqrt{3}$ cm, longer leg: 3 cm
9. shorter leg: $\sqrt{2}$ ft, longer leg: $\sqrt{6}$ ft