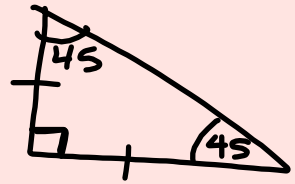
Geometry

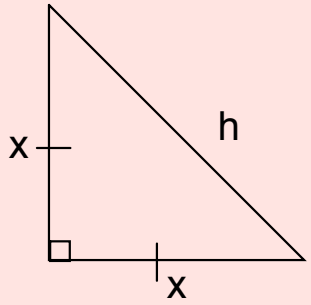
Ch. 8 Handout 8.2

Special Right Triangles

Two types of special right triangles:

Isosceles Right Δ





1. What are the measures of $\measuredangle B$ and $\measuredangle C$? Explain how you arrived at your answer.

2. Classify the triangle by its angles and sides.

3. Write the Pythagorean theorem. Write an equation in terms of x and h by substituting the side lengths in the formula.

4. Solve for h. Your answer must be in simplest radical form.

5. Redraw the triangle above, substituting your answer from step 3 for h on the diagram.

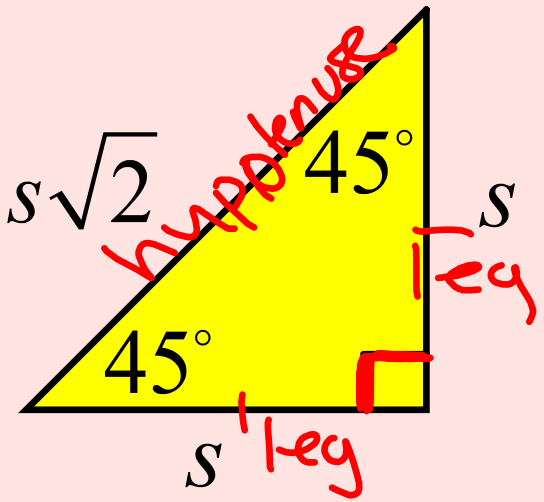
6. Summarize your findings in a complete sentence.

Theorem 8-5: 45-45-90 Triangle Theorem (Isosceles Right Triangle)

In a 45-45-90 triangle, both legs are congruent and the length of the hypotenuse is $\sqrt{2}$ times the length of the leg.

$$hypotenuse = leg\sqrt{2}$$

hyp = leg $\sqrt{2}$



1. Find the value of the variable. Use 45-45-90 triangle theorem to find the hypotenuse.

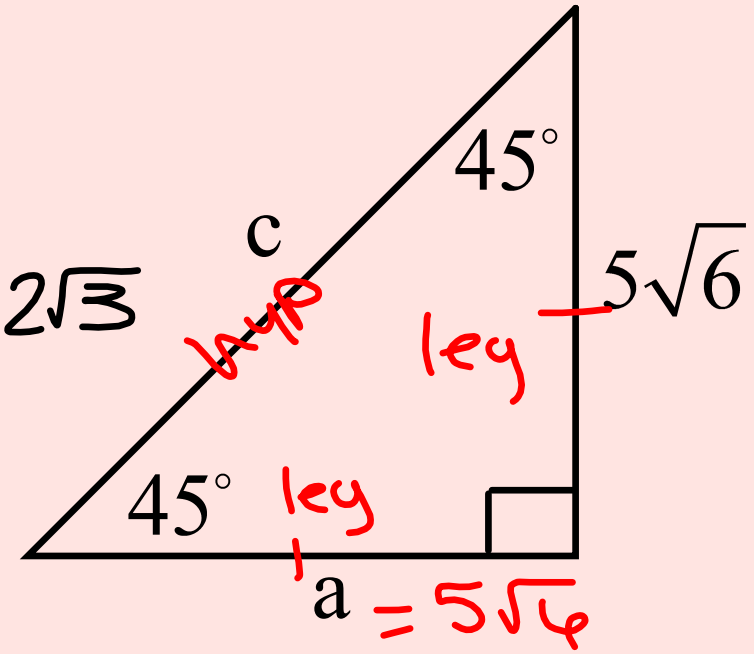
hyp = leg $\sqrt{2}$

$c = 5\sqrt{6} \cdot \sqrt{2}$

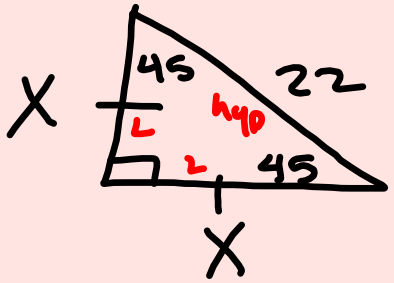
$c = 5\sqrt{12} = 5\sqrt{4 \cdot 3} = 5 \cdot 2\sqrt{3}$

$a = 5\sqrt{6}$

$c = 10\sqrt{3}$



2. Find the length of a leg of a 45-45-90 triangle with a hypotenuse of length 22.



$$\text{hyp} = \text{leg}\sqrt{2}$$

$$\frac{22}{\sqrt{2}} = \frac{x\sqrt{2}}{\sqrt{2}}$$

$$x = \frac{22\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{22\sqrt{2}}{\sqrt{4}} = \frac{22\sqrt{2}}{2} = 11\sqrt{2}$$

$$\text{leg} = 11\sqrt{2}$$

$$\text{leg} = 11\sqrt{2}$$

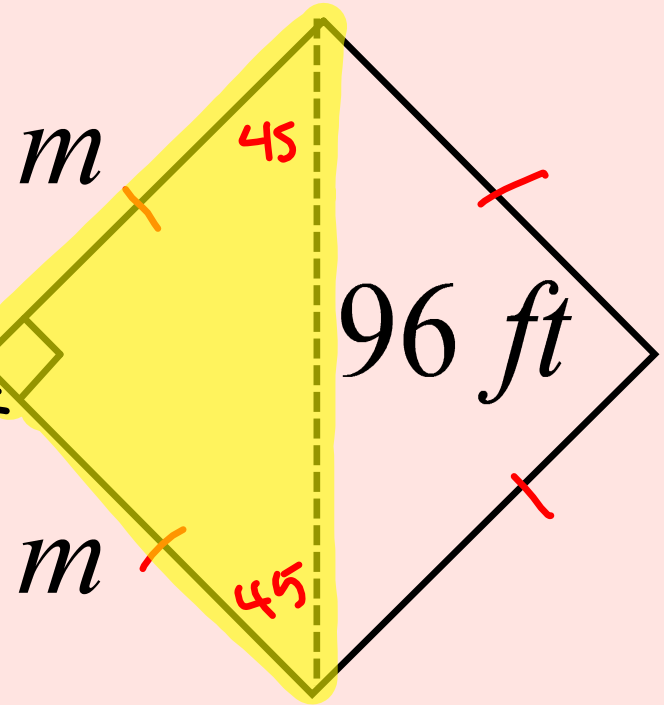
3. The distance from one corner to the opposite corner of a square playground is 96 ft. To the nearest foot, how long is each side of the playground?

$hyp = leg\sqrt{2}$

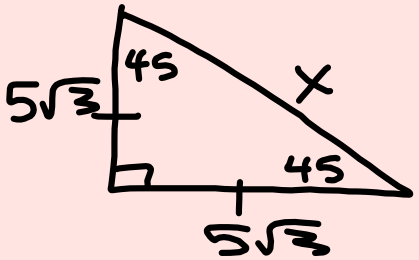
$\frac{96}{\sqrt{2}} = \frac{m\sqrt{2}}{\sqrt{2}}$

$m = \frac{96}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{96\sqrt{2}}{\sqrt{4}} = \frac{96\sqrt{2}}{2}$

$m = 48\sqrt{2}$



4. Find the length of the hypotenuse of a 45-45-90 triangle with legs of length $5\sqrt{3}$.

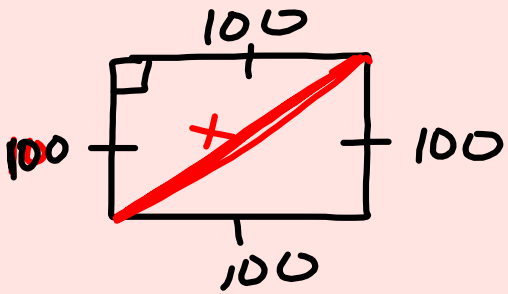


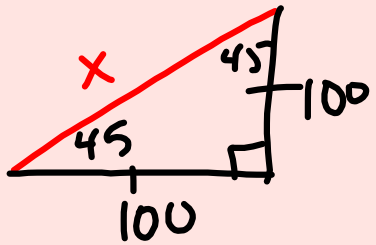
hyp = leg $\sqrt{2}$

$x = 5\sqrt{3} \cdot \sqrt{2}$

$x = 5\sqrt{6}$

5. A square garden has sides of 100 ft. long. You want to build a brick path along a diagonal of the square. How long will the path be? Round your answer to the nearest foot?





hyp = leg $\sqrt{2}$

$x = 100\sqrt{2}$

$x \approx 141$ ft

Assignment:

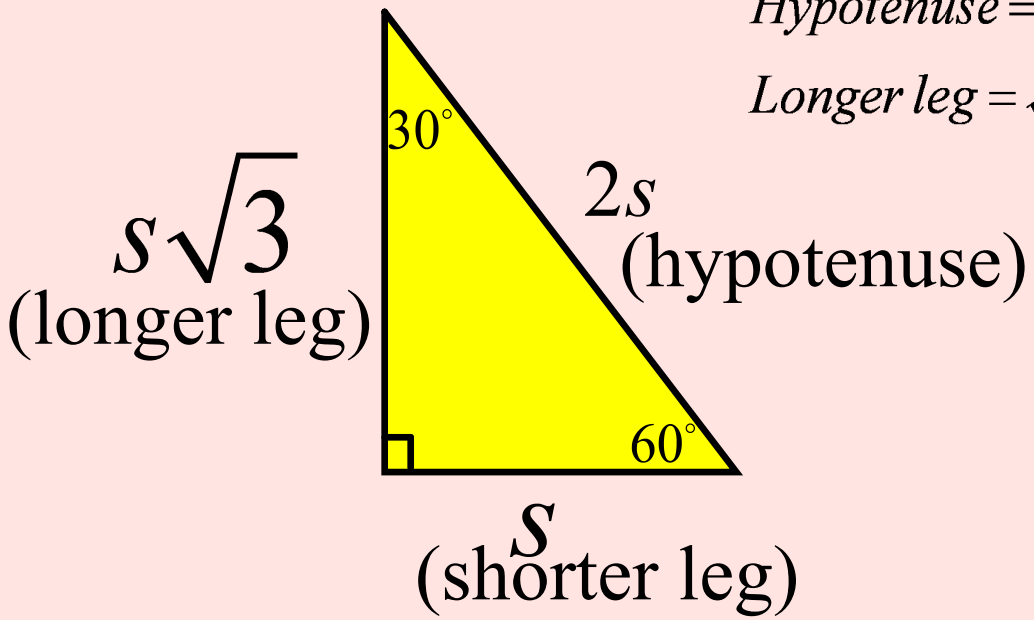
Pg 428 (1-8, 21, 22, 27, 29)

Theorem 8-6: 30-60-90 Triangle Theorem

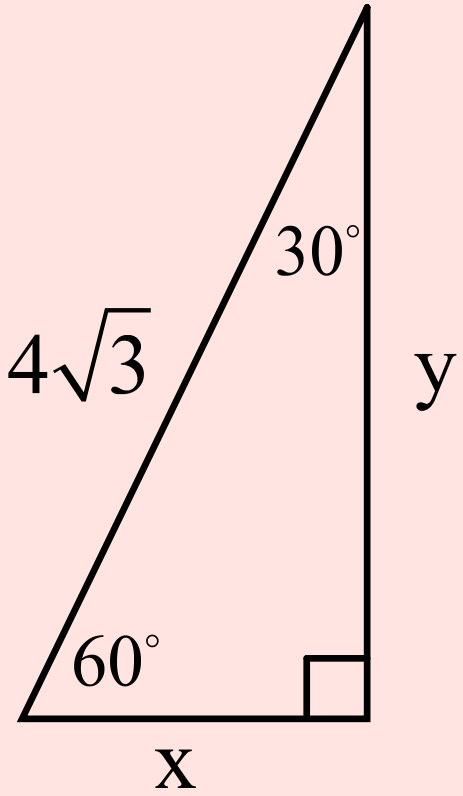
In a 30-60-90 triangle, the length of the hypotenuse is twice the length of the shorter leg. The length of the longer leg is $\sqrt{3}$ times the length of the shorter leg.

$$Hypotenuse = 2(shorter\ leg)$$

$$Longer\ leg = \sqrt{3}\,(shorter\ leg)$$

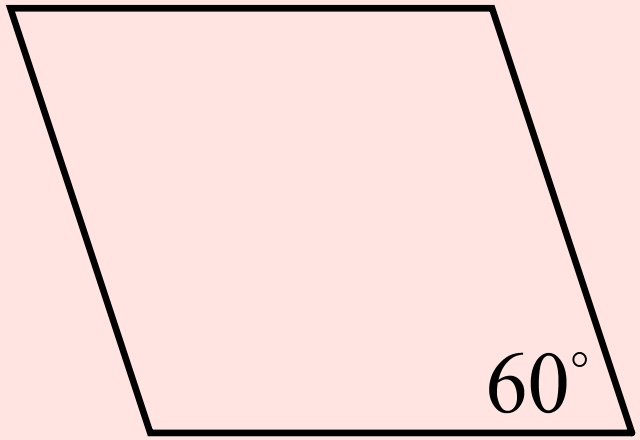


1. Find the value of each variable. Use the 30-60-90 triangle theorem to find the lengths of the legs.



2. The longer leg of a 30-60-90 triangle has length 18.
Find the lengths of the shorter leg and the hypotenuse.

3. A rhombus-shaped garden has a perimeter of 100 ft and a 60° angle. Find the area of the garden to the nearest foot.



4. A rhombus has 10-in sides, two of which meet to form the indicated angle. Find the area of each rhombus. (Hint: Use a special right triangle to find height.)

a) a 30° angle

b) a 60° angle

5. Two 12-mm sides of a triangle form a 120° angle. Find the length of the third side.

Assignment:

Pg 428 (9-20, 23, 25, 26, 30, 31)