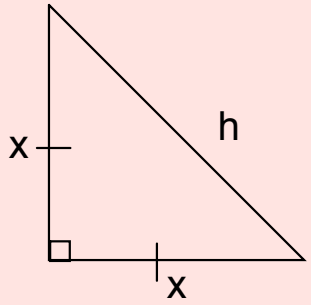
Geometry

Ch. 8 Handout 8.2

Special Right Triangles

Two types of special right triangles:



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.

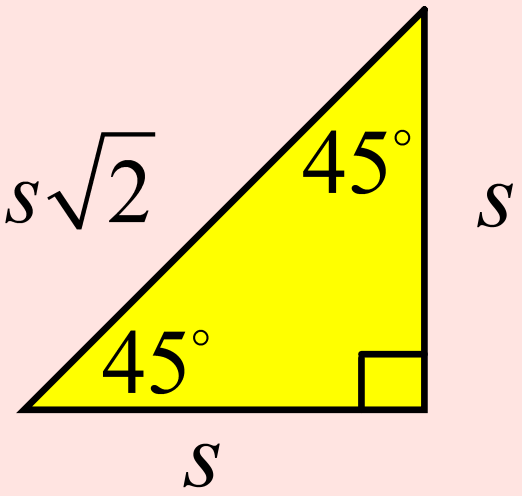
4. Solve for h. Your answer must be in simplest radical form.

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

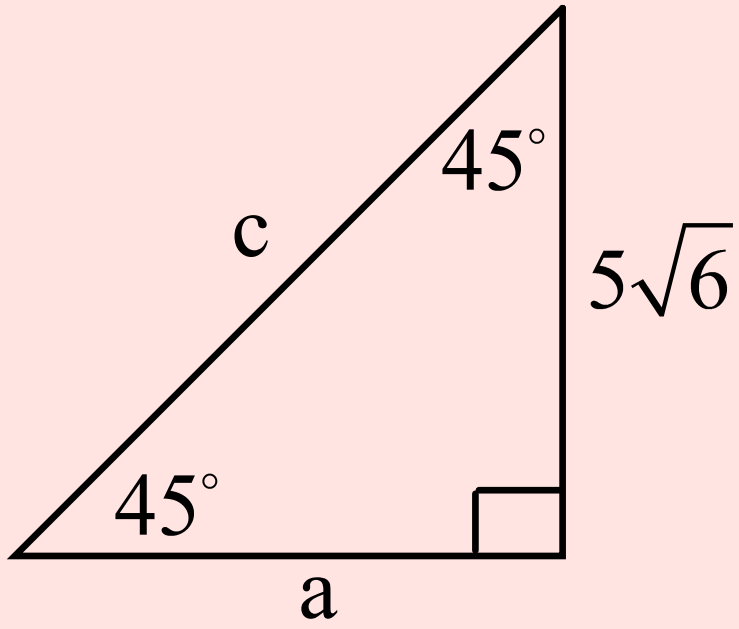
6. Summarize your findings in a complete sentence.

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.

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

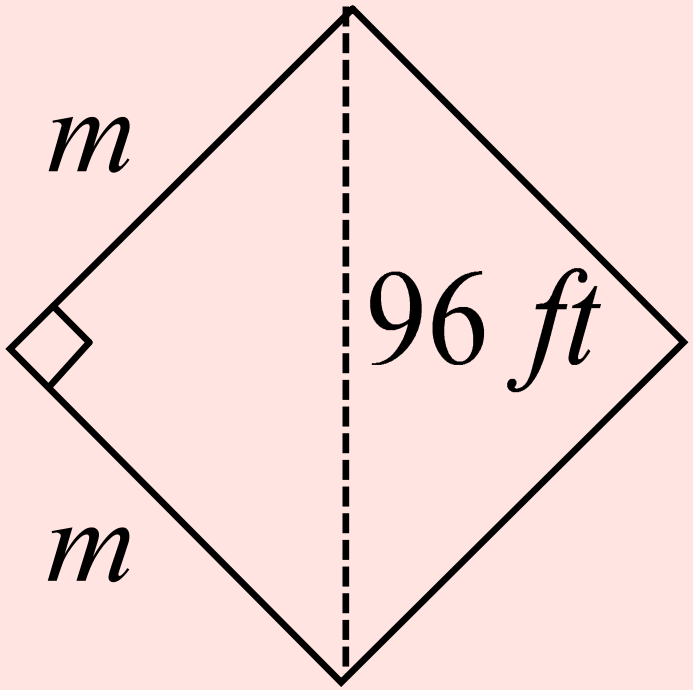


1. Find the value of the variable. Use 45-45-90 triangle theorem to find the hypotenuse.



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

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?



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

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?

Assignment:

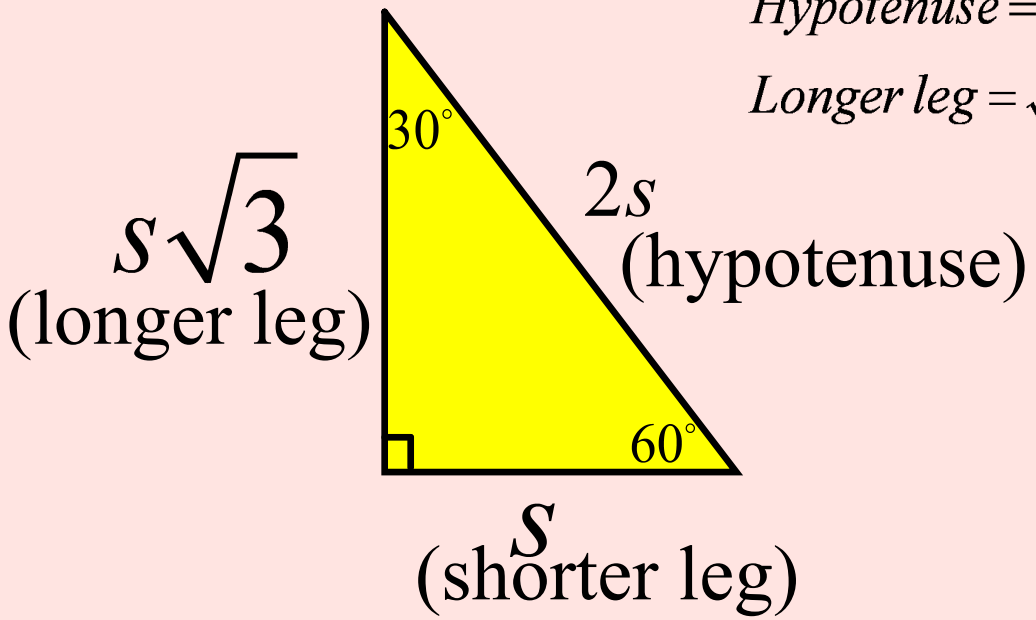
Pg 428 (1-8, 21, 22, 27, 29)

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

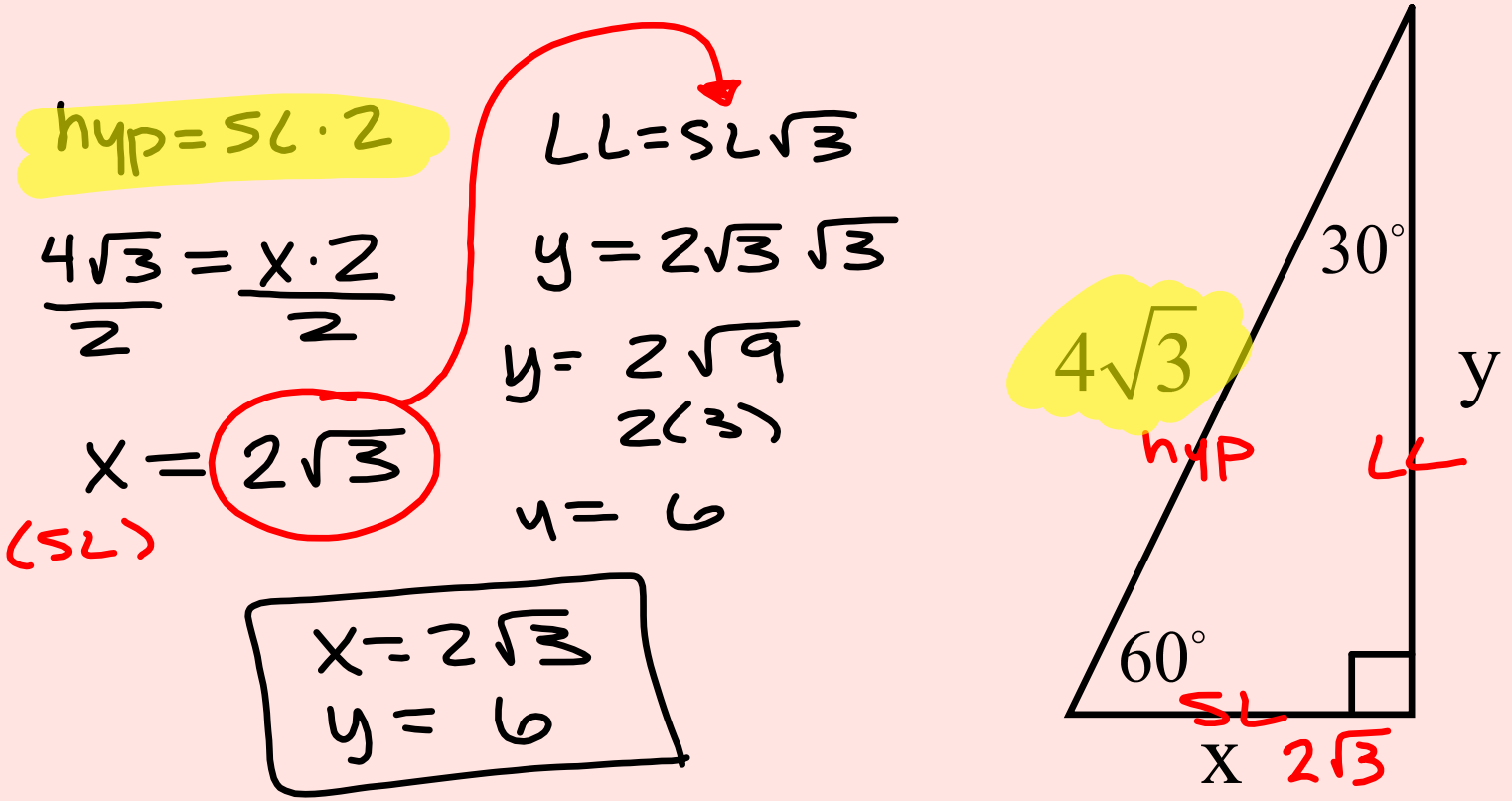
In a 30-60-90 triangle, the length of the hypotenuse is twice the length of the shorter leg. The length of the longer leg is $\sqrt{3}$ times the length of the shorter leg.

$Hypotenuse = 2(shorter\ leg)$ hyp: SL·2

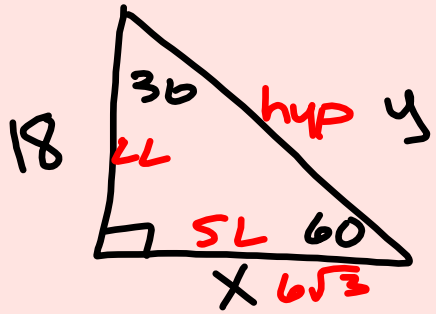
$Longer\ leg = \sqrt{3}(shorter\ leg)$ LL: SL√3



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.



hyp = SL · 2

$y = 6\sqrt{3} \cdot 2$

$y = 12\sqrt{3}$

LL = SL√3

$\frac{18}{\sqrt{3}} = \frac{x\sqrt{3}}{\sqrt{3}}$

$x = \frac{18\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{18\sqrt{3}}{\sqrt{9}} = \frac{18\sqrt{3}}{3}$

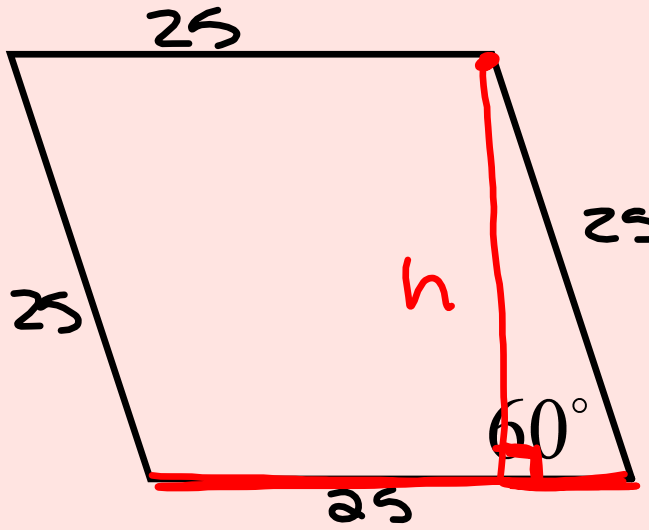
$x = 6\sqrt{3}$ (SL)

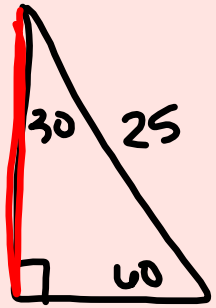
$x = 6\sqrt{3}$

$y = 12\sqrt{3}$

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.

$P = \frac{100}{4}$





$A = bh$

$A = 25\left(\frac{25\sqrt{3}}{2}\right)$

$A = \frac{625\sqrt{3}}{2}$ ft^2

$A \approx 541$ ft^2

hyp = SL · 2

$25 = SL \cdot 2$

$SL = \frac{25}{2}$

$LL = SL\sqrt{3}$

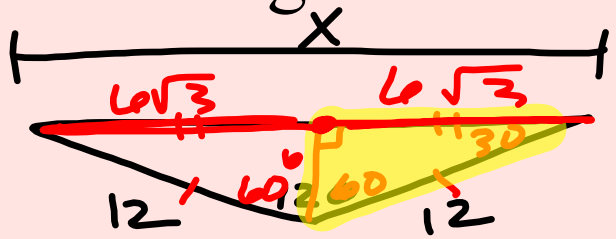
$h = \frac{25\sqrt{3}}{2}$

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.



$X = 6\sqrt{3} + 6\sqrt{3}$

$X = 12\sqrt{3}$ mm

hyp = SL · 2

$12 = SL \cdot 2$

$SL = 6$

$LL = SL\sqrt{3}$

$LL = 6\sqrt{3}$