Chapter 9: Things To Know

Section 9.1 The Pythagorean Theorem and its Converse

| Objectives	Vocabulary
1. Use the Pythagorean Theorem. 2. Use the Converse of the Pythagorean Theorem.	• Pythagorean triple

Theorem Pythagorean Theorem

If…

Then…
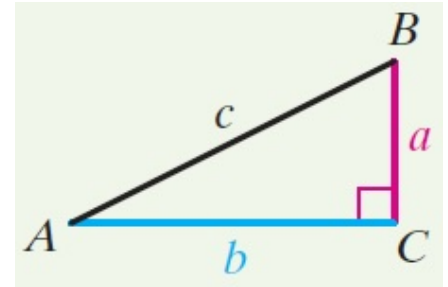
A _____ is a set of positive integers a, b, and c that satisfy the equation $a^2 + b^2 = c^2$.

Notice from this equation that c must be the greatest number.

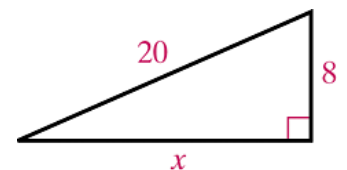Write some common Pythagorean triples here:

Example Finding the Length of the Hypotenuse
Find the length of the hypotenuse of $\triangle ABC$. Check to see that the side lengths of $\triangle ABC$ form a Pythagorean triple. Explain why.
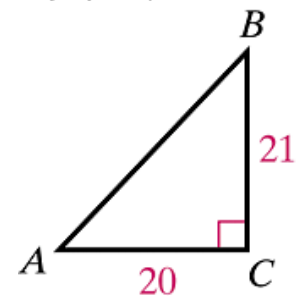

Example Finding the Length of the Hypotenuse
Find the value of x. Write the answer in simplest radical form.

Example Calculating the Placement of a Wire

A 50-foot supporting wire is to be attached to a 75-foot antenna. Because of surrounding buildings, sidewalks, and roadways, the wire must be anchored exactly 20 feet from the base of the antenna. How high from the base of the antenna must the wire be attached? Give an exact answer and a one-decimal-place approximation.
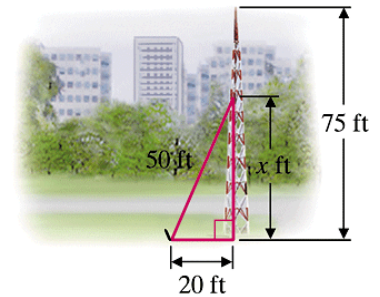
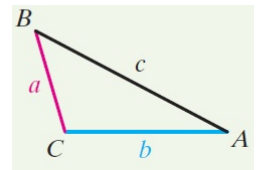**Theorem** Converse of the Pythagorean Theorem

If...
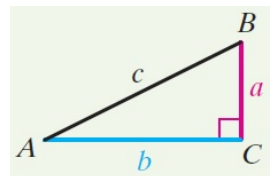
Then...

Example Identifying a Right Triangle

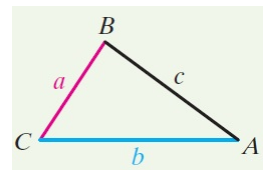A triangle has side lengths 85, 84, and 13. Is the triangle a right triangle? Explain.

Theorem

If...

Then...

Theorem

If...

Then...

Example Classifying a Triangle

A triangle has side lengths 6, 11, and 14. Is it acute, obtuse, or right?
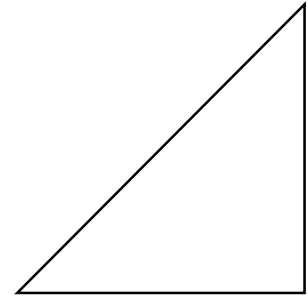
Section 9.2 Special Right Triangles

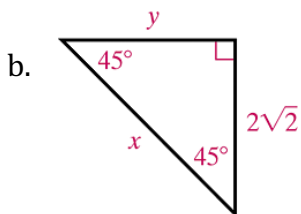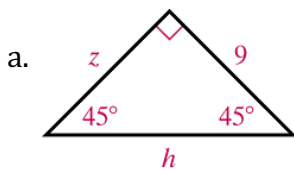| Objectives	Vocabulary
1. Use the Properties of 45°-45°-90° triangles. 2. Use the Properties of 30°-60°-90° triangles.	• No new vocabulary

Theorem 45°-45°-90° Triangle Theorem
(Write down the theorem and label the picture)

Example Finding the Length of the Hypotenuse
Find the value of each variable.

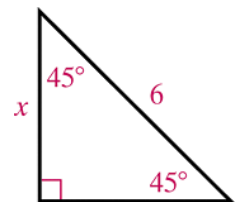a.

b.

Example Finding the Length of a Leg
Multiple Choice Find the value of x.

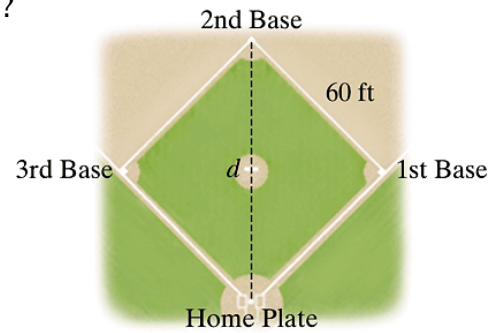   a. 3   b. $3\sqrt{2}$ c. 6   d. $6\sqrt{2}$
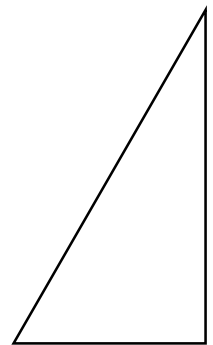
Example Finding Distance
A high school softball diamond is a square. The distance from base to base is 60 ft. To the nearest foot, how far does a catcher throw the ball from home plate to second base?

2nd Base

60 ft

3rd Base d 1st Base

Home Plate

Theorem 30°-60°-90° Triangle Theorem
(Write down the theorem and label the picture)

Example Finding the Length of the Shorter Leg
Find the value of d in simplest radical form.

d 5
60°   30°
f
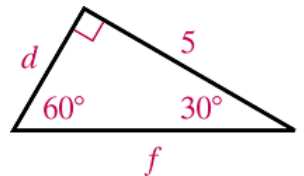
Example Applying the 30°-60°-90° Triangle Theorem
An artisan makes pendants in the shape of equilateral triangles. The height of each pendant is 18mm. What is the length s of each ide of a pendant to the nearest millimeter?

s 18 mm