

7.1**Apply the Pythagorean Theorem****Goal** • Find side lengths in right triangles.

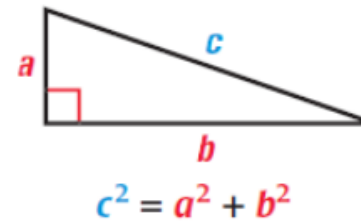
*One of the most famous theorems in mathematics is the Pythagorean Theorem, named for the ancient Greek mathematician Pythagoras (around 500 B.C.).

We use this theorem to find the lengths of the sides of a right triangle.

THEOREM*For Your Notebook***THEOREM 7.1** Pythagorean Theorem

In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs.

Proof: p. 434; Ex. 32, p. 455



Here is one way to prove the
Pythagorean Theorem:

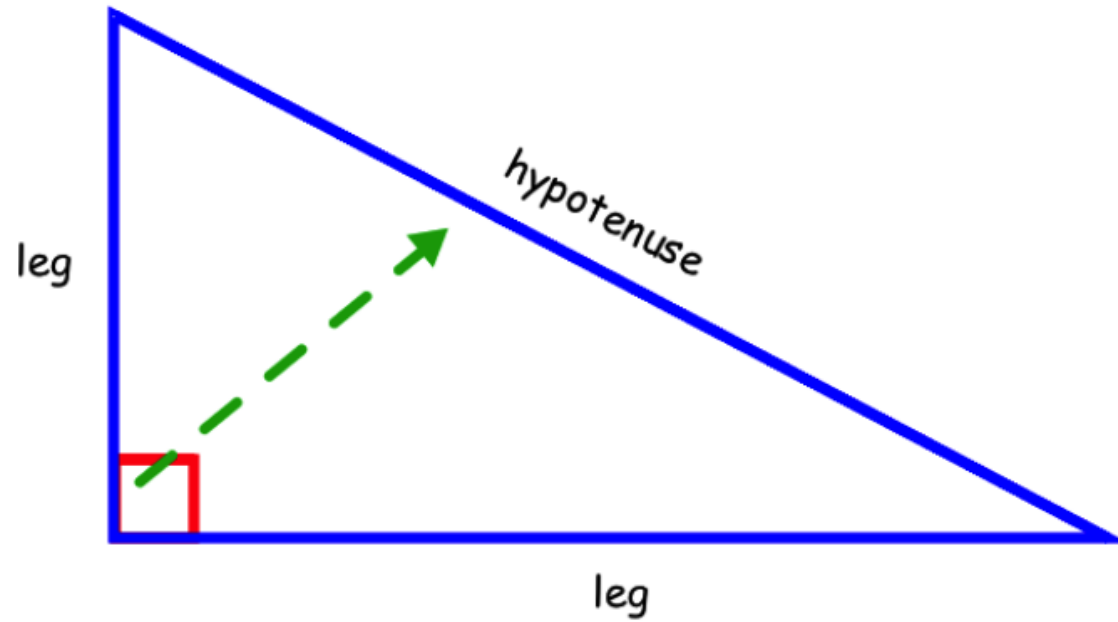


PBS Pythagorean
Theorem

Hypotenuse Characteristics

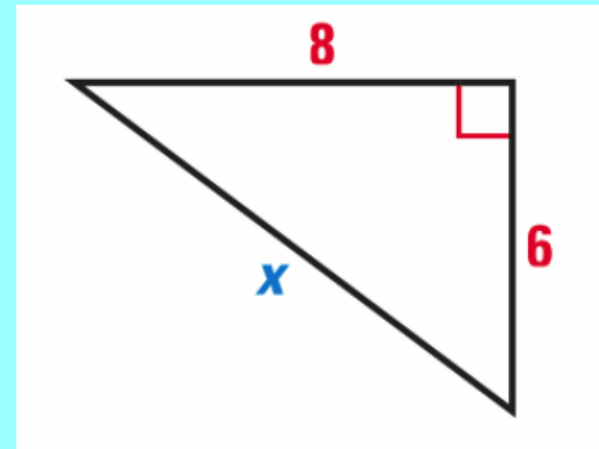
*ALWAYS the longest side!!

*Located opposite ("across") from the right angle!

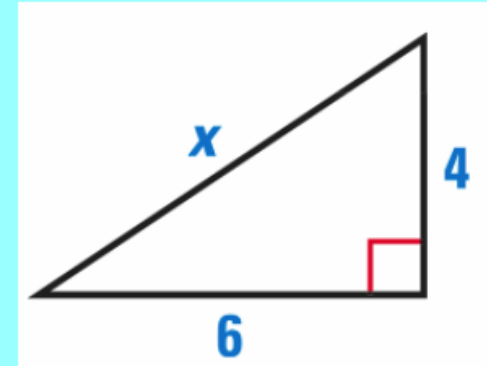
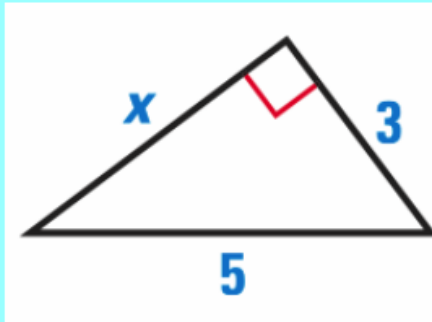


EXAMPLE 1 Find the length of a hypotenuse

Find the length of the hypotenuse of the right triangle.



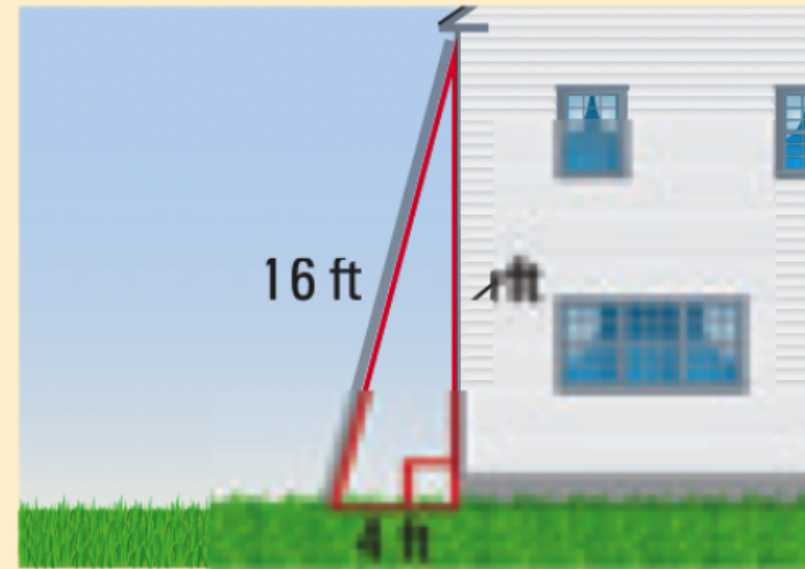
Identify the unknown side as a *leg* or *hypotenuse*. Then, find the unknown side length of the right triangle. Write your answer in simplest radical form.



EXAMPLE 2 Standardized Test Practice

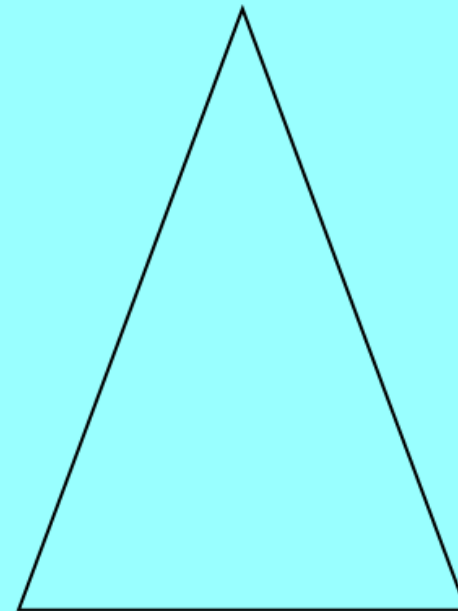
A 16 foot ladder rests against the side of the house, and the base of the ladder is 4 feet away. Approximately how high above the ground is the top of the ladder?

- (A) 240 feet (B) 20 feet
(C) 16.5 feet (D) 15.5 feet



EXAMPLE 3 Find the area of an isosceles triangle

Find the area of the isosceles triangle with side lengths 10 meters, 13 meters, and 13 meters.



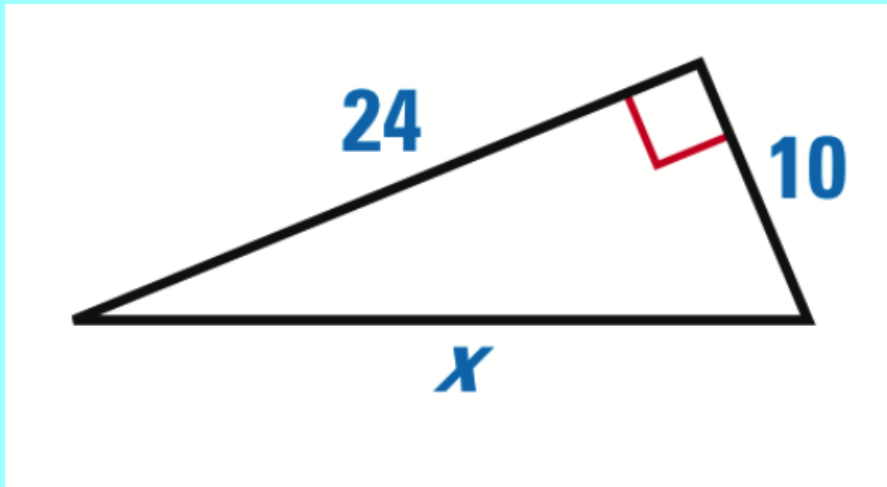
KEY CONCEPT*For Your Notebook***Common Pythagorean Triples and Some of Their Multiples**

3, 4, 5	5, 12, 13	8, 15, 17	7, 24, 25
6, 8, 10	10, 24, 26	16, 30, 34	14, 48, 50
9, 12, 15	15, 36, 39	24, 45, 51	21, 72, 75
30, 40, 50	50, 120, 130	80, 150, 170	70, 240, 250
3x, 4x, 5x	5x, 12x, 13x	8x, 15x, 17x	7x, 24x, 25x

The most common Pythagorean triples are in bold. The other triples are the result of multiplying each integer in a bold face triple by the same factor.

EXAMPLE 4 Find the length of a hypotenuse

Find the length of the hypotenuse of the right triangle.



Assignment:

p. 436 (1-31 odd, 39-49
odd)

SHOW ALL WORK!!