

The Pythagorean Theorem and Its Converse

Grade 8 math · Worksheet · Standards: 8.G.B.6, 8.G.B.7

Name: _____ Date: _____ Class: _____

These problems use the Pythagorean Theorem and its converse from standards 8.G.B.6 and 8.G.B.7. Early problems give two sides of a right triangle; later ones put the triangle inside ladders, screens, ramps, and boxes.

Sketch each situation, mark the right angle, and decide which side is the hypotenuse before writing the equation.

Standards: 8.G.B.6, 8.G.B.7 · **Level:** Grade 8

Problem 1 Find the hypotenuse (easy)

Calculate the hypotenuse of a right triangle whose legs are 20 and 21 units long.

Problem 2 Find a leg (easy)

One leg of a right triangle is 8 units and the hypotenuse is 17 units. Calculate the second leg.

Problem 3 Irrational hypotenuse (easy)

Calculate the hypotenuse, rounded to the nearest tenth, when the two legs measure 6 and 7 units.

Problem 4 Leg to the nearest tenth (easy)

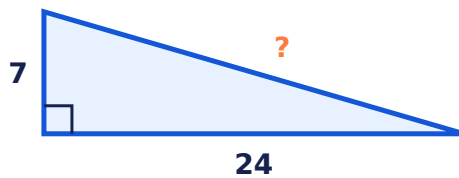
Round to the nearest tenth: how long is the second leg when the hypotenuse is 13 and one leg is 9?

Problem 5 Is it a right triangle? (easy)

Use the converse to decide whether side lengths 9, 40, and 41 describe a right triangle.

Problem 6 Read the figure (easy)

Use the figure to calculate the hypotenuse.



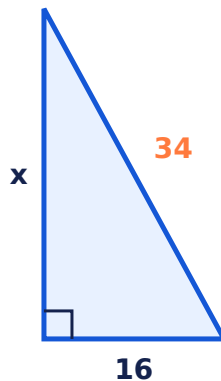
Right triangle with legs 7 and 24.

Problem 7 Not a right triangle (medium)

Explain whether side lengths 10, 11, and 15 can form a right triangle.

Problem 8 Find x (medium)

Find x in the figure.



Find x .

Problem 9 Areas of squares (medium)

The squares built on the two legs of a right triangle have areas 25 and 144. Find the length of the hypotenuse.

Problem 10 Short ladder (medium)

A 10-foot ladder stands with its base 3.5 feet from a wall. How high up the wall does it reach? Round to the nearest tenth.

Problem 11 TV size (medium)

A TV screen is 48 inches wide and 27 inches tall. Find the diagonal length to the nearest inch.

Problem 12 Right or not? (medium)

Is a triangle with sides 1.5, 2, and 2.5 meters a right triangle?

Problem 13 Across the field (medium)

A rectangular field is 45 yards by 108 yards. How long is its diagonal?

Problem 14 Isosceles right triangle (medium)

Each leg of an isosceles right triangle is 12 centimeters. Find the hypotenuse, exactly and to the nearest tenth.

Problem 15 Fire truck ladder (medium)

A fire truck ladder is 26 feet long. Its base is 10 feet from a building. How high on the building does it reach?



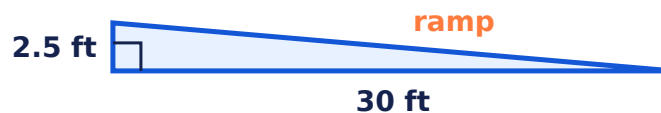
Ladder against a building.

Problem 16 Baseball throw (hard)

A youth baseball diamond is a square with sides of 60 feet. A catcher throws from home plate to second base. How far is the throw, to the nearest tenth of a foot?

Problem 17 Wheelchair ramp (hard)

A ramp rises 2.5 feet over a horizontal run of 30 feet. How long is the sloping surface of the ramp, to the nearest tenth of a foot?



Ramp: run 30 ft, rise 2.5 ft.

Problem 18 Shipping box (hard)

A shipping box measures 12 inches by 16 inches by 21 inches. What is the length of the longest straight rod that fits inside?

Problem 19 Drone flight (hard)

A drone flies 36 meters east, then 15 meters north, then climbs straight up 20 meters. Find its distance from the starting point, to the nearest tenth of a meter.

Problem 20 Is the deck square? (hard)

A carpenter marks a corner of a deck with sides 2.4 meters and 3.2 meters. The diagonal measures 4.1 meters. Is the corner a right angle? What should the diagonal be?