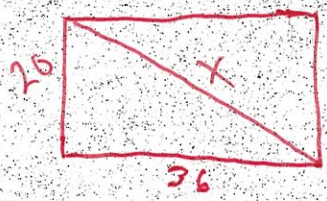


Key

# THE PYTHAGOREAN THEOREM Word Problems

Many real world problems can be modeled and solved using the Pythagorean Theorem. When solving these problems, it is always helpful to draw a picture!

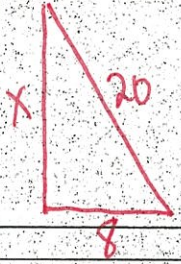
1. A flat-screen TV in the shape of a rectangle has a width of 36 inches and a height of 20 inches. Find the length of the diagonal.

Picture: 

Solve: 
$$20^2 + 36^2 = x^2$$
$$400 + 1296 = x^2$$
$$1696 = x^2$$
$$x = 41.2 \text{ in}$$

Solution: 41.2 in

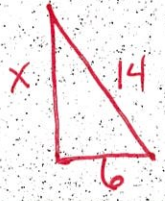
2. A 20-foot piece of wire is attached from the top of a flagpole to a stake in the ground 8 feet from the base of the pole. Find the height of the flagpole.

Picture: 

Solve: 
$$x^2 + 8^2 = 20^2$$
$$x^2 + 64 = 400$$
$$\underline{-64 \quad -64}$$
$$x^2 = 336$$
$$x = 18.3$$

Solution: 18.3 ft


3. A 14-foot ladder is leaned against a wall. If the base of the ladder is 6 feet from the wall, how high up the wall will the ladder reach?

Picture: 

Solve: 
$$x^2 + 6^2 = 14^2$$
$$x^2 + 36 = 196$$
$$\underline{-36 \quad -36}$$
$$x^2 = 160$$
$$x = 12.6$$

Solution: 12.6 ft

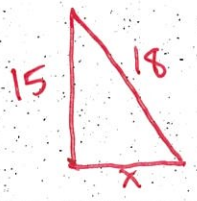
4. Josh and Ben spotted a bear in the woods while riding their bikes. Josh rode 3 miles north and Ben rode 2 miles east. How far apart are the two boys?

Picture: 

Solve: 
$$2^2 + 3^2 = x^2$$
$$4 + 9 = x^2$$
$$13 = x^2$$
$$x = 3.6$$

Solution: 3.6 mi

5. How far from the base of a house should you place a 18-foot ladder if it is to reach a window that is 15 feet high?

Picture: 

Solve: 
$$x^2 + 15^2 = 18^2$$
$$x^2 + 225 = 324$$
$$\underline{-225 \quad -225}$$
$$x^2 = 99$$
$$x = 9.9$$

Solution: 9.9 ft

6. An isosceles triangle has legs that measure 7 feet. If the height of the triangle is 5 feet, find the length of its base.

Picture:



Solve:

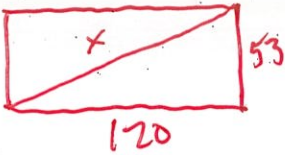
$$\begin{aligned} x^2 + 5^2 &= 7^2 \\ x^2 + 25 &= 49 \\ x^2 &= 24 \\ x &= 4.9 \end{aligned}$$

$$\begin{array}{r} 7.1 \\ \times 2 \\ \hline 14.2 \end{array}$$

Solution: 14.2 ft

7. A football field is 120 yards long by 53 yards wide. If a player runs diagonally from one corner to the opposite corner, how far will they travel?

Picture:



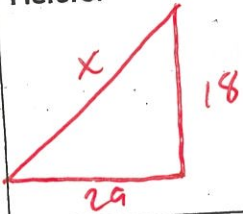
Solve:

$$\begin{aligned} 53^2 + 120^2 &= x^2 \\ 2809 + 14400 &= x^2 \\ 17209 &= x^2 \\ x &= 131.2 \end{aligned}$$

Solution: 131.2 yds

8. On a map, Norristown is 18 miles south of Lincoln, and Lincoln is 29 miles west of Allenport. Find the distance from Norristown to Allenport.

Picture:



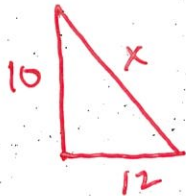
Solve:

$$\begin{aligned} 18^2 + 29^2 &= x^2 \\ 324 + 841 &= x^2 \\ 1165 &= x^2 \\ x &= 34.1 \end{aligned}$$

Solution: 34.1 mi

9. A set of stairs is 10 feet tall and covers a horizontal distance of 12 feet. If a handrail is to be installed that extends the entire length of the stairs, what length must it be?

Picture:



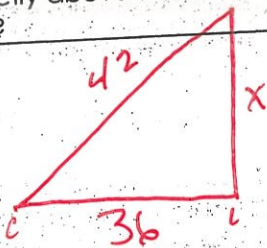
Solve:

$$\begin{aligned} 10^2 + 12^2 &= x^2 \\ 100 + 144 &= x^2 \\ 244 &= x^2 \\ x &= 15.6 \end{aligned}$$

Solution: 15.6 ft

10. Cara is flying a kite at the park using a string that is 42 meters long. She notices that the kite is directly above her friend Leah. If Cara and Leah are standing 36 meters apart, how high is the kite?

Picture:



Solve:

$$\begin{aligned} x^2 + 36^2 &= 42^2 \\ x^2 + 1296 &= 1764 \\ -1296 & \quad -1296 \\ \hline x^2 &= 468 \\ x &= 21.6 \end{aligned}$$

Solution: 21.6 m