

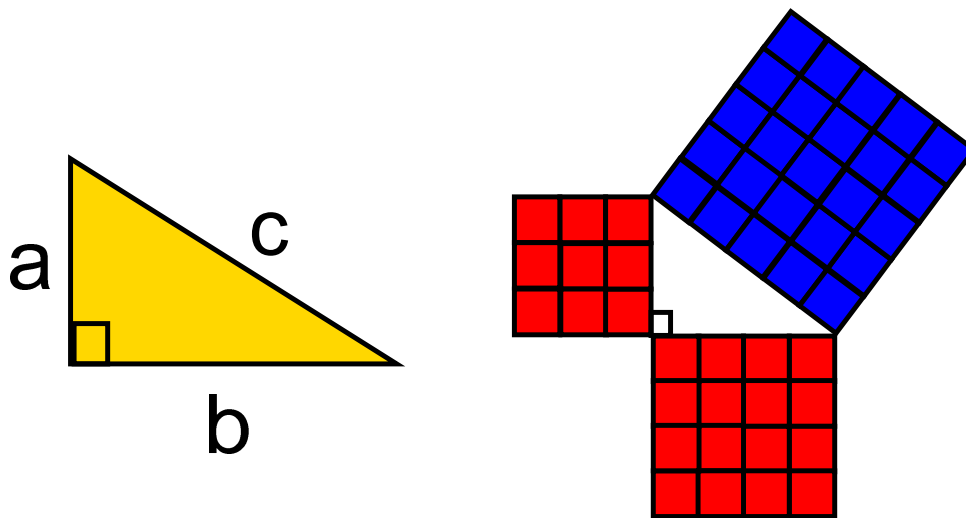
Unit 1: Linear Equations

Day 7: Pythagorean Theorem

Today we will....

1. Review the Pythagorean Theorem
2. Use the Pythagorean Theorem to solve problems.

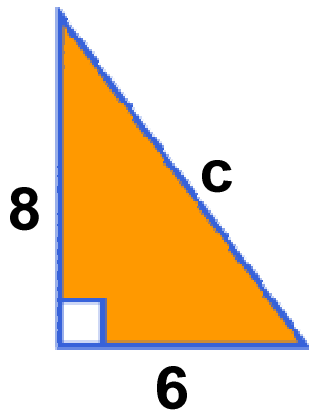
Exploring the Pythagorean Relationship



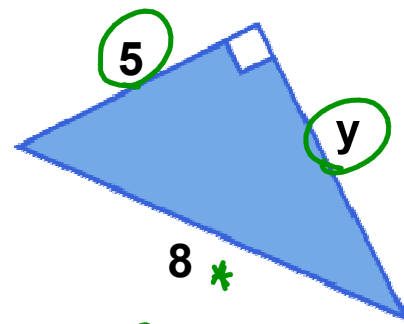
$$a^2 + b^2 = c^2$$

The sum of the areas of squares on the two shorter sides of right angled triangle equals the area of the square on the third side (the hypotenuse).

The Pythagorean Theorem can be used to find the length of the third side of a right triangle when the length of two sides is known.

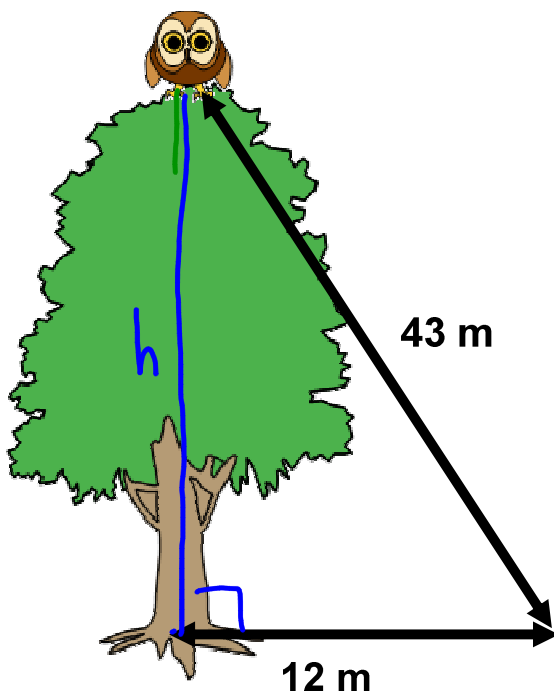


$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 8^2 + 6^2 &= c^2 \\
 64 + 36 &= c^2 \\
 100 &= c^2 \\
 c^2 &= 100 \\
 c &= \sqrt{100} \\
 c &= 10
 \end{aligned}$$



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 5^2 + y^2 &= 8^2 \\
 25 + y^2 &= 64 \\
 y^2 &= 64 - 25 \\
 y^2 &= 39 \\
 y &= \sqrt{39} \\
 y &= 6.24 \\
 y &= 6.2
 \end{aligned}$$

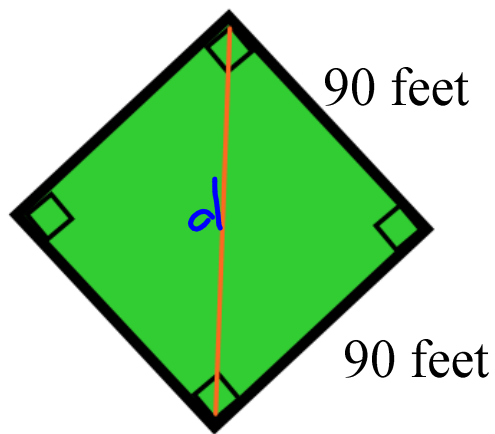
Ex. 1 How far above the ground is Ollie the owl?



$$\begin{aligned}a^2 + b^2 &= c^2 \\12^2 + h^2 &= 43^2 \\144 + h^2 &= 1849 \\h^2 &= 1849 - 144 \\h^2 &= 1705 \\h &= \sqrt{1705} \\h &= 41.3\end{aligned}$$

\therefore Ollie is 41.3m above the ground.

Ex. 2 On a baseball diamond the distance from one base to the next is 90 feet. How far is it from home base to second?



Notice that the baseball diamond is divided into two equal right triangles.

The distance between home base and second base is the hypotenuse.

$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 90^2 + 90^2 &= d^2 \\
 8100 + 8100 &= d^2 \\
 16200 &= d^2 \\
 d &= \sqrt{16200} \\
 d &= 127.3
 \end{aligned}$$

\therefore It is 127.3 ft from 2nd to Home.

Practice Questions:

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#2ab, 3, 5, 6a, 7abcd, 10