Pythagorean Theorem
Study Guide

11.4: Apply the Pythagorean Theorem

- Be able to use the Pythagorean Theorem to find missing sides of right triangles

Ex: $a = 30$, $b = 40$

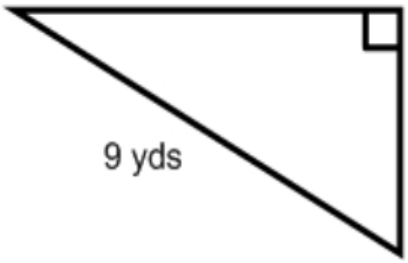
$a^2 + b^2 = c^2$
$30^2 + 40^2 = c^2$
$900 + 1600 = c^2$
$2500 = c^2$
$\sqrt{2500} = \sqrt{c^2}$
$50 = c$

Always start by writing formula
Plug in numbers.

Ex: A leg: 15; Hypotenuse: 25

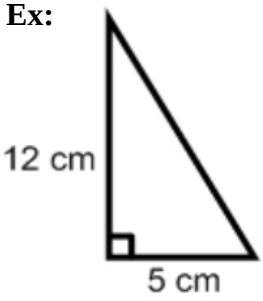
$a^2 + b^2 = c^2$
$15^2 + b^2 = 25^2$ *since 25 is the hypotenuse it takes the place of c!)
$225 + b^2 = 625$
$-225 \quad -225$
$b^2 = 400$
$\sqrt{b^2} = \sqrt{400}$
$b = 20$

Ex:



$a^2 + b^2 = c^2$
$4^2 + b^2 = 9^2$ *since 9 is across from the right angle it takes the place of c!)
$16 + b^2 = 81$
$-16 \quad -16$
$b^2 = 65$
$\sqrt{b^2} = \sqrt{65}$
$b = 8.06$

Ex:



$a^2 + b^2 = c^2$
$12^2 + 5^2 = c^2$
$144 + 25 = c^2$
$169 = c^2$
$\sqrt{169} = \sqrt{c^2}$
$13 = c$

- **Be able to use the Pythagorean Theorem to decide if three sides could form a right triangle**

Ex: 9, 15, 20

$a^2 + b^2 = c^2$
$9^2 + 15^2 = 20^2$
$81 + 225 = 400$
$306 = 400$
No

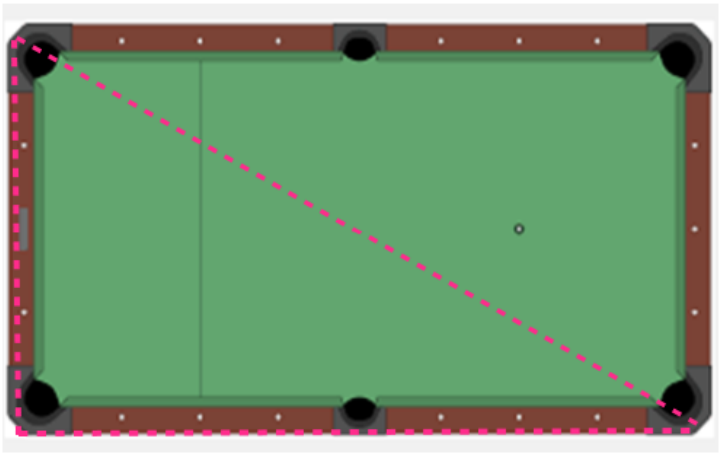
Ex: 12, 72, 71

$a^2 + b^2 = c^2$
$12^2 + 71^2 = 72^2$
$144 + 5041 = 5184$
$5185 = 5184$
Yes

*Don't forget that 72 must go in the place of c because it's the longest side.

- **Use Pythagorean Theorem to solve real-world problems**

Ex: The playing bed of a pool table is in the shape of a rectangle, which measures 154 inches by 20 inches. What is the length of the diagonal of the table? Round your answer to the nearest inch.



$a^2 + b^2 = c^2$
$154^2 + 20^2 = c^2$
$23716 + 400 = c^2$
$24116 = c^2$
$\sqrt{24116} = \sqrt{c^2}$
$c = 155.3$ inches