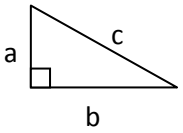
The Pythagorean Theorem

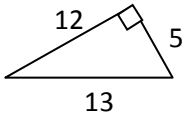
$$a^2 + b^2 = c^2$$

Pythagorean Theorem

If you have a right triangle with sides measuring A, B, and C units long (where C is the longest side – the hypotenuse), then $a^2 + b^2 = c^2$



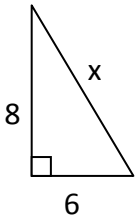
$a^2 + b^2 = c^2$



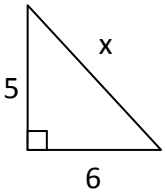
$5^2 + 12^2 = 13^2$

Hypotenuse – Remember that the hypotenuse is always the longest side in the right triangle, is always located directly across from the right angle, and is the 'c' in the Pythagorean theorem.

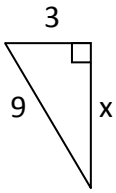
Use the Pythagorean Theorem To Solve For Missing Sides In a Right Triangle



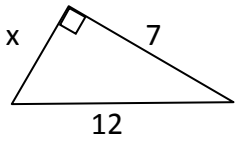
$8^2 + 6^2 = x^2$
$64 + 36 = x^2$
$100 = x^2$
$x = 10$



$5^2 + 6^2 = x^2$
$25 + 36 = x^2$
$61 = x^2$
$x = \sqrt{61}$

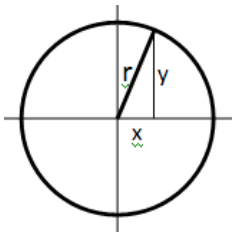


$3^2 + x^2 = 9^2$
$9 + x^2 = 81$
$x^2 = 72$
$x = \sqrt{72}$



$x^2 + 7^2 = 12^2$
$x^2 + 49 = 144$
$x^2 = 95$
$x = \sqrt{95}$

Pythagorean Theorem With Trigonometry and the Unit Circle - Important Trig. Identity: $\boldsymbol{sin^2\theta + cos^2\theta = 1}$



From the unit circle we know that $x^2 + y^2 = r^2$.
Remember that the radius is 1 in the unit circle, so we can say that $x^2 + y^2 = 1$
We also need to remember that x = cosine and y = sine when analyzing an angle in the unit circle
If $x^2 + y^2 = 1$ while $x = cos\theta$ and $y = sin\theta$, then we know that $cos^2\theta + sin^2\theta = 1$

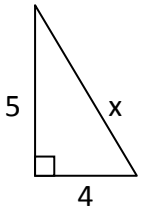
Try These For Extra Practice

Solve for the variable.

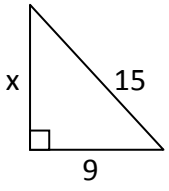
1. $5^2 + m^2 = 9^2$
2. $r^2 = 3^2 + 7^2$
3. $d^2 + 11^2 = 13^2$

Find the missing side in each triangle.

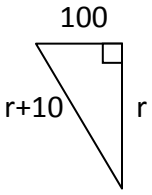
4.



5.



6.



The Pythagorean Theorem

ANSWER KEY

1. $\sqrt{56}$

2. $\sqrt{58}$

3. $\sqrt{48}$

4. $\sqrt{41}$

5. 12

6. 495