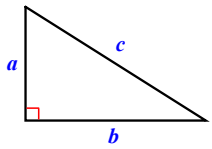
Pythagorean Theorem

title

Pythagorean Theorem

In a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the legs.



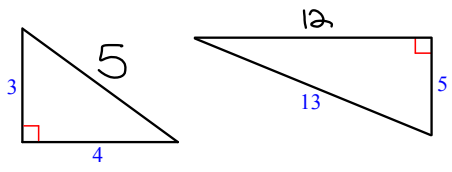
(hypotenuse)^2 = (leg)^2 + (leg)^2

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

pythagorean thm

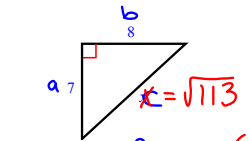
Pythagorean triple—a set of three positive integers a, b, and c that satisfy the equation $c^2 = a^2 + b^2$

- Examples: 3, 4, 5 and 5, 12, 13
- NO decimals, fractions, or radicals.



pythagorean triples

Find the length of the hypotenuse of the right triangle.

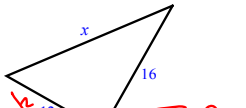


$7^2 + 8^2 = c^2$

$49 + 64 = c^2$

$\sqrt{113} = \sqrt{c^2}$

$\sqrt{113} = c$



$(12)^2 + (16)^2$

$144 + 256$

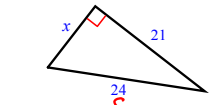
$400 = c^2$

$\sqrt{400} = 20$

$x = 20$

examples

Find the length of the leg of the right triangle. $c^2=a^2+b^2$

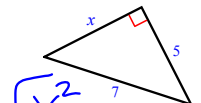


$x^2+21^2=24^2$

$\sqrt{x^2}=\sqrt{24^2-21^2}$

$\sqrt{x^2}=\sqrt{135}$

$x=3\sqrt{15}$

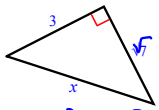


$\sqrt{x^2}=\sqrt{7^2-5^2}$

$x=2\sqrt{6}$

examples

Find the unknown side length.

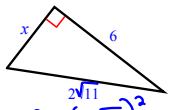


$3^2+(\sqrt{7})^2=c^2$

$9+7=c^2$

$\sqrt{16}=\sqrt{c^2}$

$4=c$



$x^2+6^2=(2\sqrt{11})^2$

$x^2+36=44$

$\sqrt{x^2}=\sqrt{8}$

$x=2\sqrt{2}$

examples

Radicals Review

$\sqrt{8}\cdot\sqrt{2}$

$\sqrt{16}=4$

$\sqrt{12}\cdot\sqrt{15}=\sqrt{180}$

180
18 10
2 9 2 5
3 3

$6\sqrt{5}$

radicals

Radicals Review

$\frac{21}{\sqrt{7}}\cdot\frac{\sqrt{7}}{\sqrt{7}}=\frac{21\sqrt{7}}{7}=3\sqrt{7}$

$\frac{4}{\sqrt{18}}\cdot\frac{\sqrt{18}}{\sqrt{18}}=\frac{4\sqrt{18}}{18}=\frac{2\sqrt{18}}{9}$

18
2 9
3 3

$=\frac{6\sqrt{2}}{9}=\frac{2\sqrt{2}}{3}$

radicals

Conclusion

1. **What is the Pythagorean Theorem?**
   $a^2+b^2=c^2$ c is hypotenuse
2. **How do you know which side is the hypotenuse?** Across from Right Angle
3. **Questions????**

Nov 11-9:20 AM

Assignment

Pythagorean Theorem Worksheet

Nov 11-11:05 AM