PYTHAGOREAN THEOREM

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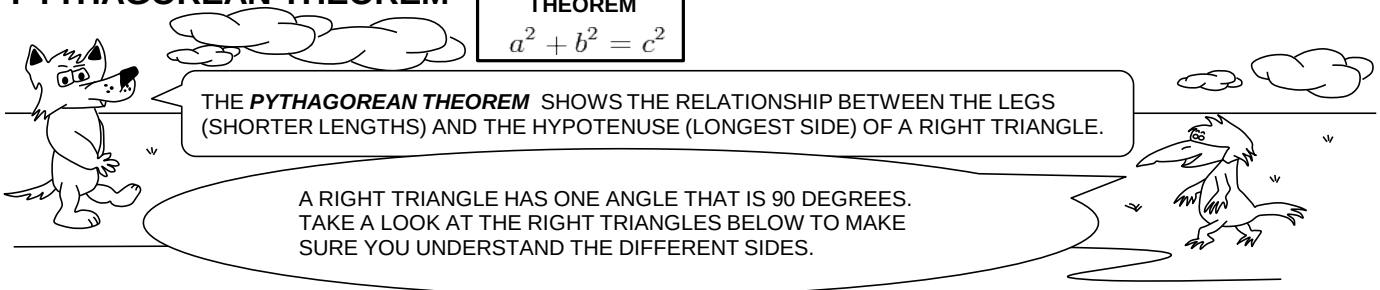
$$a^2 + b^2 = c^2$$

ANSWERS

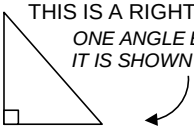


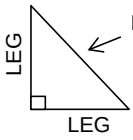
THE ***PYTHAGOREAN THEOREM*** SHOWS THE RELATIONSHIP BETWEEN THE LEGS (SHORTER LENGTHS) AND THE HYPOTENUSE (LONGEST SIDE) OF A RIGHT TRIANGLE.

A RIGHT TRIANGLE HAS ONE ANGLE THAT IS 90 DEGREES. TAKE A LOOK AT THE RIGHT TRIANGLES BELOW TO MAKE SURE YOU UNDERSTAND THE DIFFERENT SIDES.

THIS IS A RIGHT TRIANGLE.

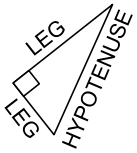
ONE ANGLE EQUALS 90 DEGREES.
IT IS SHOWN BY A SMALL SQUARE.

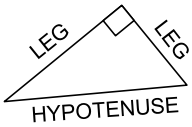




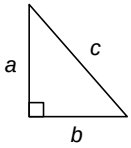
HYPOTENUSE

IT'S ALWAYS OPPOSITE THE RIGHT ANGLE
IT'S ALWAYS THE LONGEST SIDE.





THE THEOREM CAN BE WRITTEN AS AN EQUATION RELATING THE LEGS TO THE HYPOTENUSE. WE CAN USE ***a***, ***b***, and ***c*** TO SHOW THE LENGTHS OF EACH SIDE. THE EQUATION TELLS US THAT IF WE SQUARE THE LEGS AND THEN ADD THEM TOGETHER THEY WILL EQUAL THE SQUARE OF THE HYPOTENUSE.



SINCE THIS IS A RIGHT TRIANGLE.

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

PYTHAGOREAN THEOREM

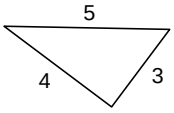
$$a^2 + b^2 = c^2$$

THIS ONLY WORKS FOR A RIGHT TRIANGLE.

WHEN YOU SQUARE A NUMBER YOU TIMES IT BY ITSELF.

$3^2 = 3 \times 3 = 9$

Example #1



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

$3^2 + 4^2 = 5^2$

$(3 \times 3) + (4 \times 4) = (5 \times 5)$

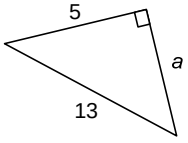
$9 + 16 = 25$

$25 = 25$

YOU CAN SHOW WHETHER OR NOT A TRIANGLE IS A RIGHT TRIANGLE.

25 EQUALS 25. THIS TELLS US THE TRIANGLE IS A RIGHT TRIANGLE.

Example #2



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

$a^2 + 5^2 = 13^2$

$a^2 + (5 \times 5) = (13 \times 13)$

$a^2 + 25 = 169$

$a^2 + 25 = 169$

$a^2 = 144$

$a = 12$

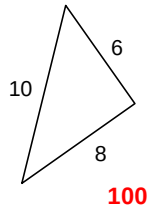
$12 \times 12 = 144$

YOU CAN FIND THE LENGTH OF A MISSING SIDE OF A RIGHT TRIANGLE.

ASK YOURSELF, "WHAT NUMBER TIMES ITSELF WILL EQUAL 144?"

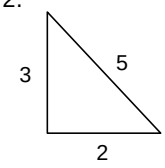
Now your turn. Use the Pythagorean Theorem to show if the triangle is a right triangle. See example #1.

1.



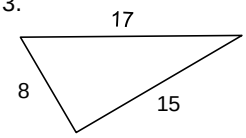
100 = 100
RIGHT TRIANGLE

2.



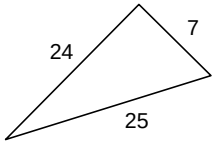
13 ≠ 25
NO

3.



289 = 289
RIGHT TRIANGLE

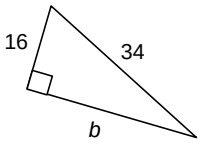
4.



625 = 625
RIGHT TRIANGLE

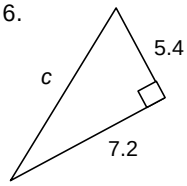
Find the missing side for each right triangle. See example #2.

5.



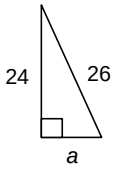
***b* = 30**

6.



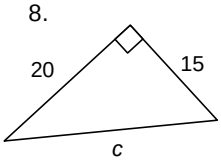
***c* = 9**

7.



***a* = 10**

8.



***c* = 25**