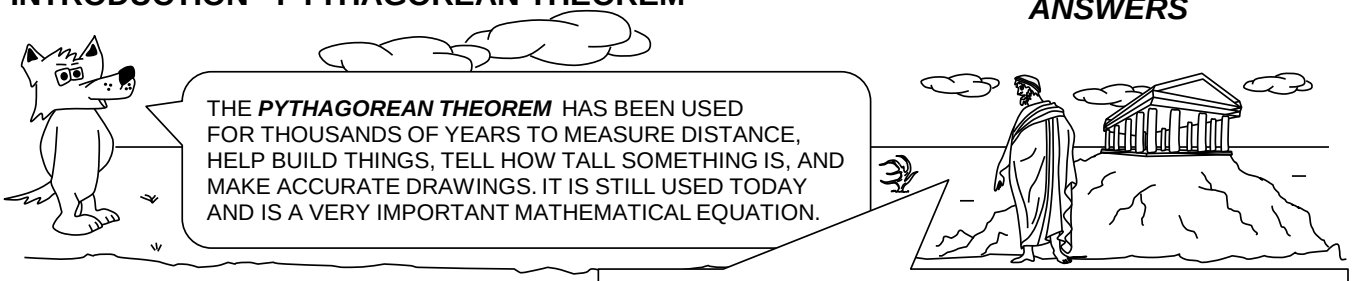
INTRODUCTION - PYTHAGOREAN THEOREM

ANSWERS

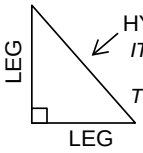


THE ***PYTHAGOREAN THEOREM*** HAS BEEN USED FOR THOUSANDS OF YEARS TO MEASURE DISTANCE, HELP BUILD THINGS, TELL HOW TALL SOMETHING IS, AND MAKE ACCURATE DRAWINGS. IT IS STILL USED TODAY AND IS A VERY IMPORTANT MATHEMATICAL EQUATION.

THIS IS A RIGHT TRIANGLE.
ONE ANGLE EQUALS 90 DEGREES.

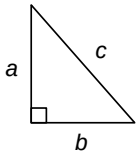
EVEN THOUGH IT HAS BEEN USED FOR THOUSANDS OF YEARS, A GREK MATHEMATICIAN NAMED ***PYTHAGORAS*** WAS THE FIRST PERSON TO ACTUALLY PROVE ITS EXISTENCE.

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



HYPOTENUSE
IT'S ALWAYS OPPOSITE THE RIGHT ANGLE AND 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.



PYTHAGOREAN THEOREM

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

THE EQUATION TELLS US THAT IF WE SQUARE THE LEGS AND THEN ADD THEM TOGETHER THEY WILL EQUAL THE SQUARE OF THE HYPOTENUSE.

THIS IS VERY IMPORTANT BECAUSE WE CAN USE THE THEOREM TO FIND A MISSING SIDE OF A RIGHT TRIANGLE. CHECK OUT THE EXAMPLES BELOW.

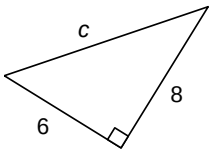
WHEN YOU SQUARE A NUMBER YOU TIMES IT BY ITSELF.

$4^2 = 4 \times 4 = 16$

PYTHAGOREAN THEOREM

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

Ex:1



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

$6^2 + 8^2 = c^2$

$(6 \times 6) + (8 \times 8) = c^2$

$36 + 64 = c^2$

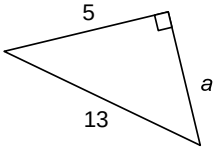
$100 = c^2$

$10 = c$

ASK YOURSELF, "WHAT NUMBER TIMES ITSELF WILL EQUAL 100?"

$10 \times 10 = 100$

Ex:2



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

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

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

$a^2 + 25 = 169$

$a^2 + 25 = 169$

$a^2 = 144$

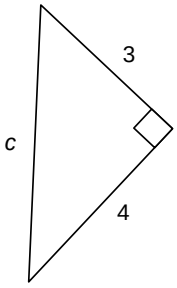
$a = 12$

WHAT NUMBER TIMES ITSELF WILL EQUAL 144?

$12 \times 12 = 144$

Now your turn. Find the missing side for each right triangle.

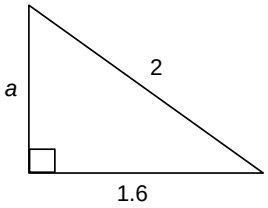
1.



$9 + 16 = c^2$

$5 = c$

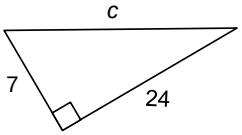
2.



$a^2 + 2.56 = 4$

$a = 1.2$

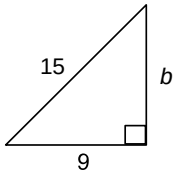
3.



$49 + 576 = c^2$

$25 = c$

4.



$81 + b^2 = 225$

$b = 12$