

4.1

PYTHAGORAS AND HIS HYPOTENUSE

How a Puzzle Leads to the Proof of One of the Gems of Mathematics



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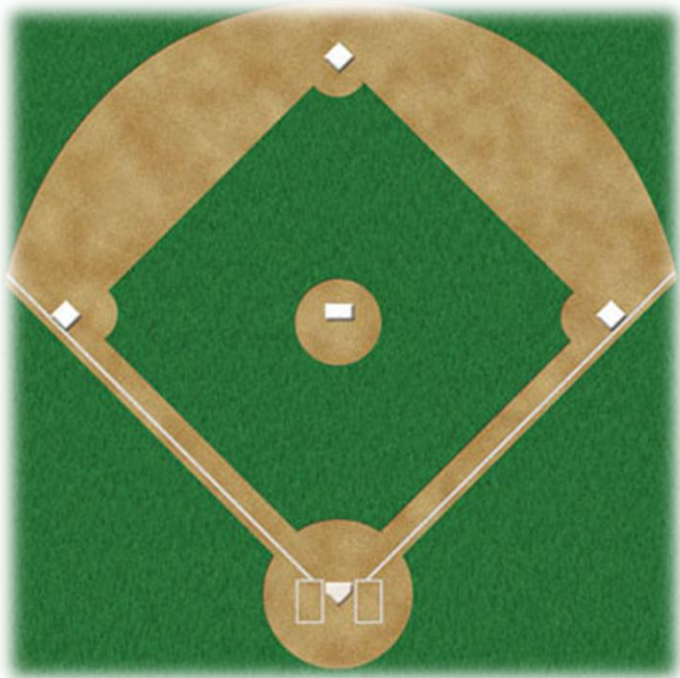
QUESTION OF THE DAY:

A baseball diamond is really a square measuring 90 feet on a side.

How far does a catcher have to throw the ball to get it from home plate to second base?

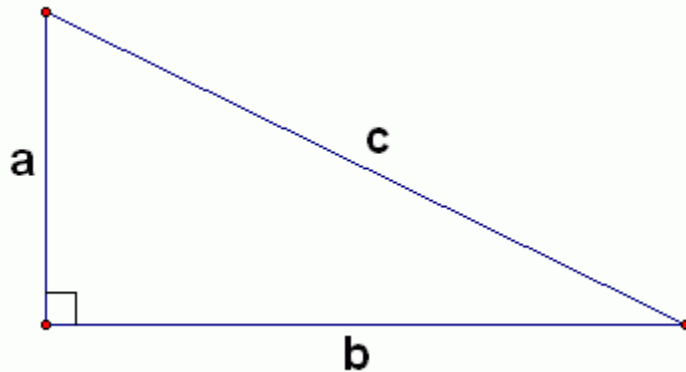
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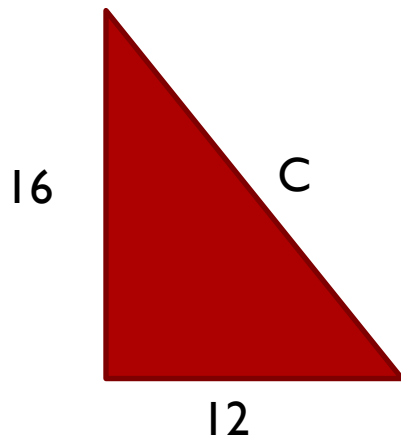
Pythagorean Theorem

- In any right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the other two sides.



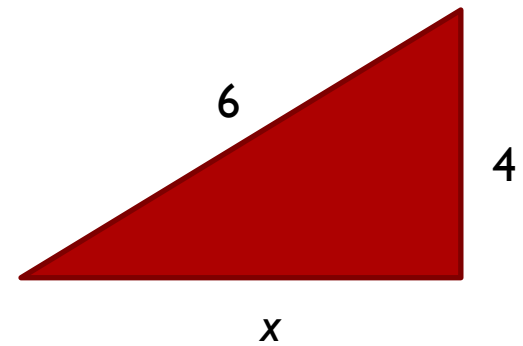
Pythagorean Theorem

- Use the Pythagorean theorem to find the length of the unknown side of the following right triangle.



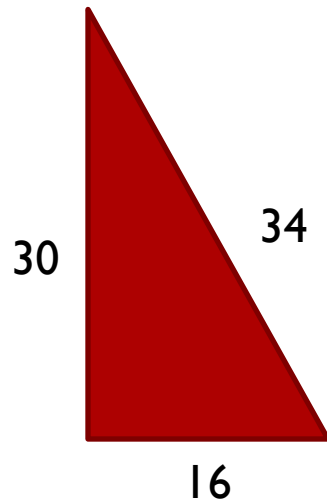
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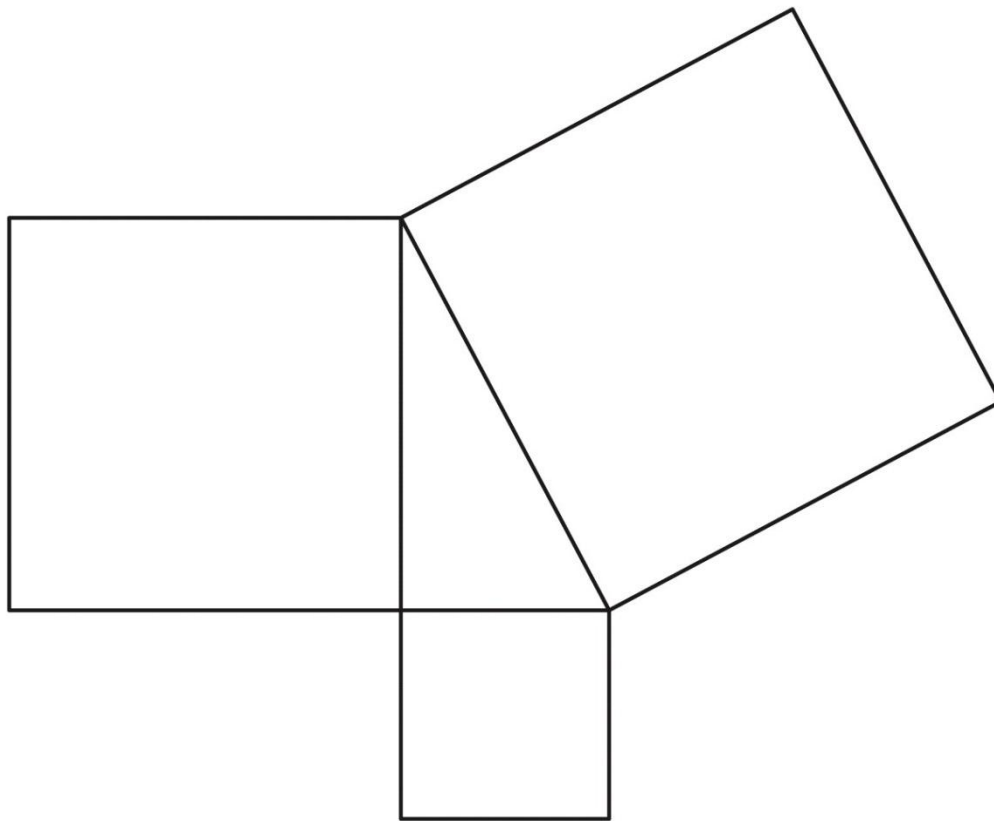
Pythagorean Theorem

- Use the Pythagorean theorem to determine if the given triangle is a right triangle.



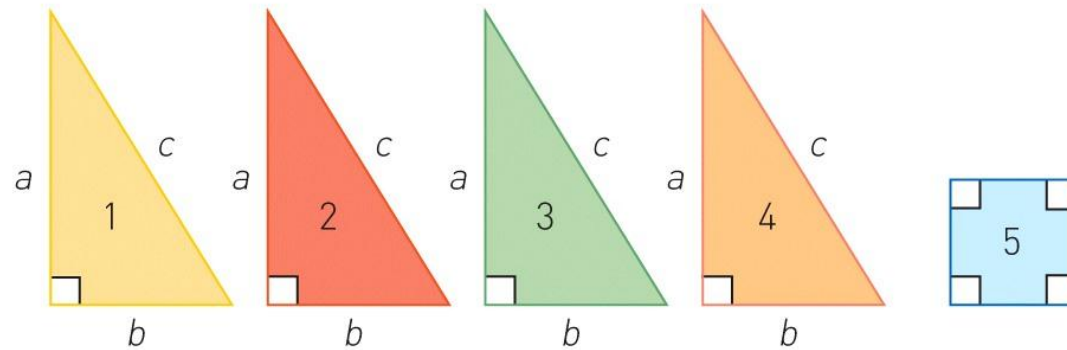
Pythagorean Theorem

- Geometric - the sum of (the areas of) the two small squares equals (the area of) the large square.

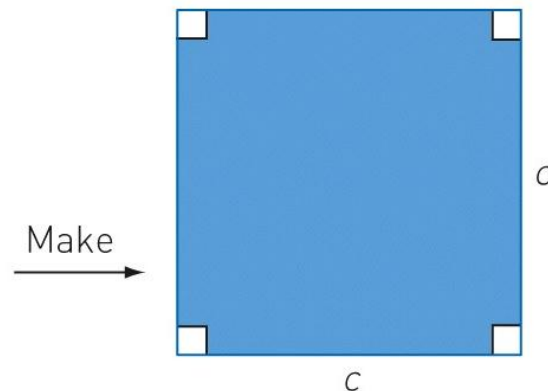


Proving the Pythagorean Theorem

- Use the five pieces from your kit to construct a large square with each side of length c .



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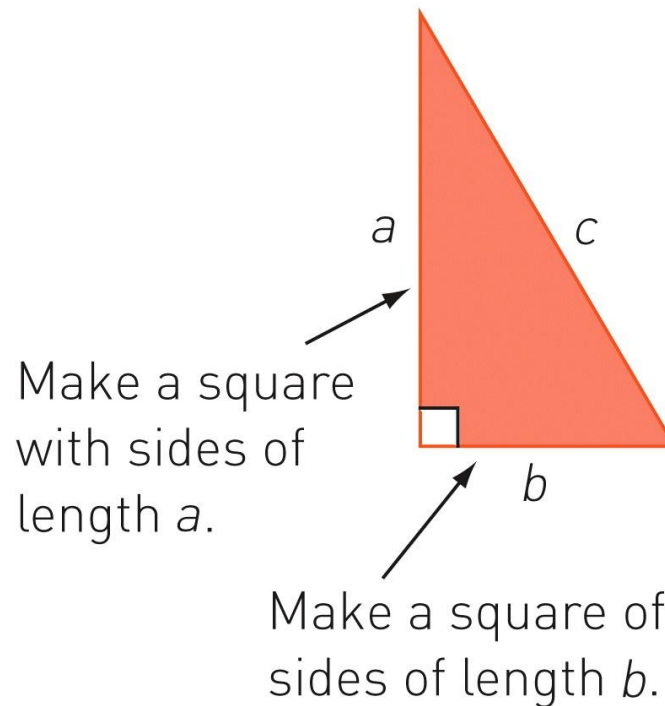


Proving the Pythagorean Theorem

Proving the Pythagorean Theorem

- Rearrange the five pieces you just used into a new configuration to create two smaller squares: one having side length a and the other having side length b .

Make two squares.





Proving the Pythagorean Theorem

Proving the Pythagorean Theorem

- The same four triangles and small square made a large square of area c^2 now fit together to make a figure having area $a^2 + b^2$.

Pythagorean Proofs

- <http://www.cut-the-knot.org/pythagoras/index.shtml>

Homework

- Read 4.1 Pythagoras and His Hypotenuse pgs 208-217.
- Mindscapes 4.1 #2, 6, 12, 15, 18
- Famous Mathematician
- The Math Book Presentation