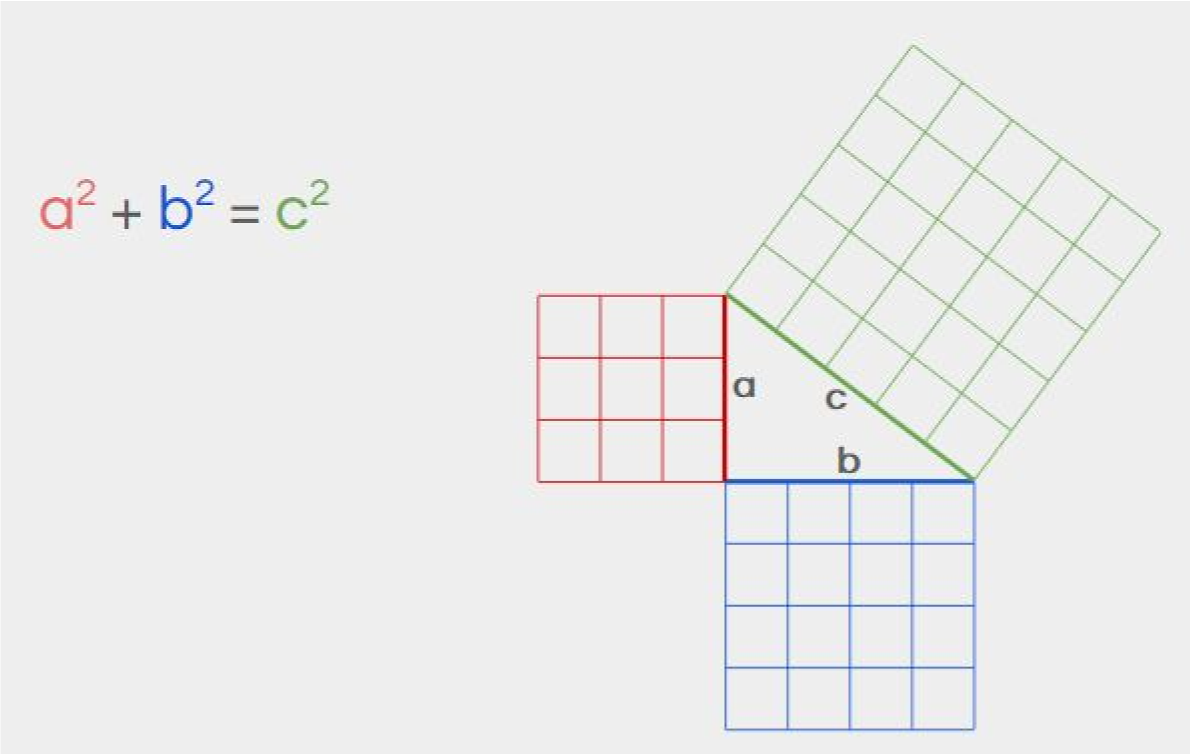
EXERCISE - DAY 1 - PYTHAGOREAN THEOREM

Learning Objectives:

1. Explore the physical proof of the Pythagorean Theorem.



Activity:

Using cardboard or cardstock, create and play with a physical representation of the Pythagorean Theorem.

1. Recreate the equation with the physical pieces.

Questions Posed:

Q1: What does this teach you about the relationship of the sides of a 3:4:5 triangle?

A1: The math of the pythagorean theorem can be represented physically.

Q2: What could this be used for in real life?

A2: open ended; example, to see if a piece of paper, fabric, carpet, or other material, is square (measure up one side 4 units, and up another side 3 units, then see if the end points of those lines are 5 units apart - if so - the corner of the material measured is square)

Q3: What could this be used for in a game?

A3: If you have a plane defined by Vector a and Vector b, you can determine how far apart the ends of those two vectors are by solving for c. (distance formula)

Key Vocabulary & Concepts:

Pythagorean Theorem - the square of the length of the hypotenuse (the longest side of a right triangle) is equal to the sum of the squares of the other two sides sides.

Proof - a deductive argument for a mathematical statement; the physical proof of the Pythagorean Theorem shows - physically - how the principles work

3:4:5 triangle - a right triangle where the sides are in the ratio of the integers, 3:4:5

Supplemental Vocabulary & Concepts

Vectors - a mathematical structure that has a magnitude and a direction

Magnitude - size of a mathematical object

Direction - where something is pointing

Dot Product - also called a scalar product; an algebraic operation that takes two equal-length sequences of numbers (usually coordinate vectors) and returns a single number.

Cross Product - also called a vector product; a binary operation on two vectors in three-dimensional space. It results in a vector which is perpendicular to both of the vectors being multiplied and therefore normal to the plane containing them.

Normal - to be at right angles; a vector at a right angle to a plane