

Development of Virtual lab :Round 3 (R3)-Storyboard - Template (Worksheet)

Name of Faculty: Mr. Narendra Rajpoot

Institute: Rajkiya Engineering College Banda

Email ID (as submitted in the registration form): rajpootnkumar@gmail.com

Discipline to which the Lab belongs: Trigonometric Mathematics

Name of the Lab: Engineering Mathematics

Name of experiment: Pythagoras Theorem

(only one Experiment per worksheet):

Kindly Refer these documents before filling the worksheet

1. Coursework (MOOC) on Pedagogy , Storyboard , Lab Manual : <http://bit.ly/Vlabs-MOOC>
2. Additional Documentation booklet for reference. <http://vlabs.iitb.ac.in/vlabs-dev/document.php>
3. Sample Git Repository. : <https://github.com/Rahulsingh1996/Pythagoras-Theorem>

1. Aim and Objective

To verify Pythagoras theorem by performing an activity.

2. Theory

Pythagoras Theorem

In mathematics, the Pythagorean theorem is a relation in Euclidean geometry among the three sides of a right triangle (right-angled triangle). In terms of areas, it states: In any right-angled triangle, the area of the square whose side is the hypotenuse (the side opposite the right angle) is equal to the sum of the areas of the squares whose sides are the two legs (the two sides that meet at a right angle).

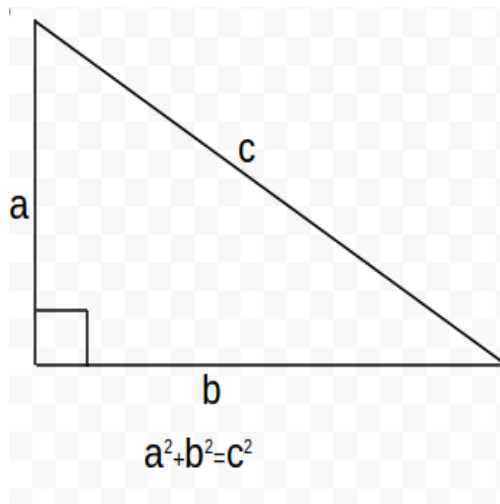


fig (a)

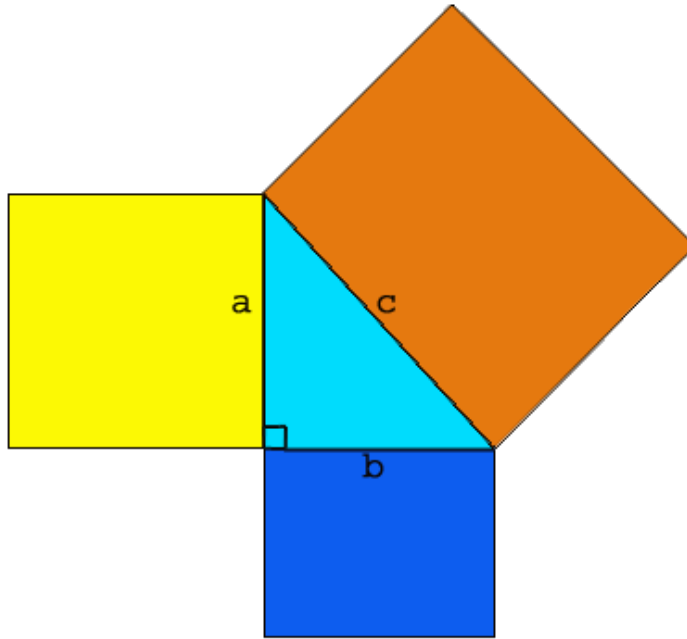
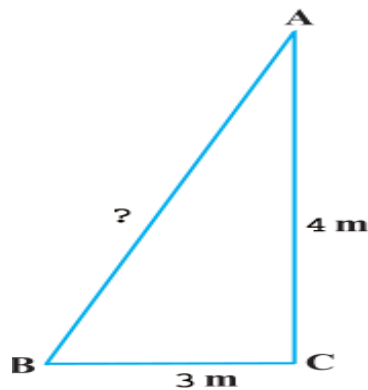


fig (b)

The theorem can be written as an equation relating the lengths of the sides a , b and c , often called the Pythagorean equation $a^2 + b^2 = c^2$. where c represents the length of the hypotenuse, and a and b represent the lengths of the other two sides.

Example:-



Given a right angled triangle ABC, length AB = ?

By Pythagoras theorem, we have:

$$(AB)^2 = (BC)^2 + (CA)^2$$

$$\begin{aligned}(AB)^2 &= (3)^2 + (4)^2 \\ (AB)^2 &= 25 \text{ or } = (5)^2 \\ \text{So, } AB &= 5\end{aligned}$$

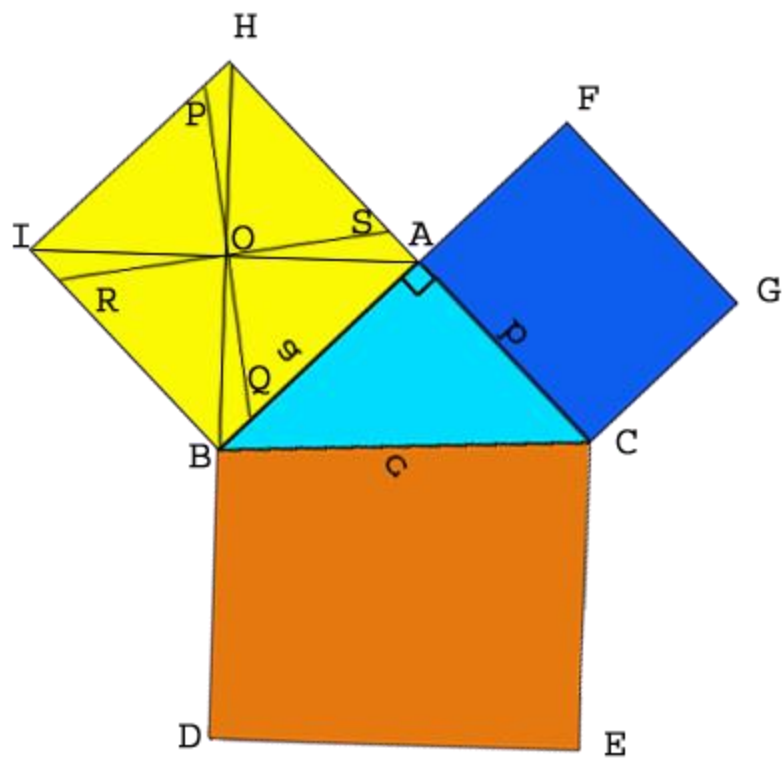
As performed in the real lab:

Materials Required:

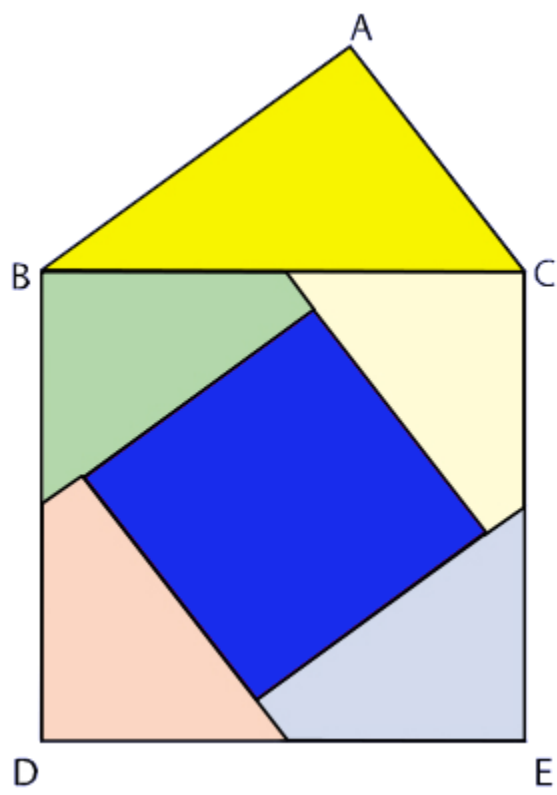
card board, colored pencils, pair of scissors, fevicol, geometry box.

3. Procedure:

1. Take a card board of size say 20 cm × 20 cm.
2. Cut any right angled triangle and paste it on the cardboard. Suppose its sides are a, b and c.
3. Cut a square of side a cm and place it along the side of length a cm of the right angled triangle.
4. Similarly cut squares of sides b cm and c cm and place them along the respective sides of the right angled triangle. Label the diagram as shown in Fig(a).
5. Join BH and AI. These are two diagonals of the square ABIH. The two diagonals intersect each other at the point O. Through O, draw RS || BC.
6. Draw PQ, the perpendicular bisector of RS, passing through O.
7. Now the square ABIH is divided in four quadrilaterals. Color them as shown in Fig(a) .
8. From the square ABIH cut the four quadrilaterals. Color them and name them as shown in Fig(b).



Fig(a)



Fig(b)

As performed in the simulator:

1. Find a right angled triangle by giving base and heights in the input box.
2. Find the respective three sides of a triangle.
3. Pythagoras theorem is used to check if a given triangle is a right-angled triangle or not.
4. Use the Pythagorean theorem to derive the equation of a circle.
5. Use the area of right triangles to deduce the areas of other shapes.
6. Use the Pythagorean Theorem $a^2+b^2=c^2$ to write an equation to be solved.
7. Rearrange the same four triangles such that they form two equal rectangles inside a larger square.
8. Recognize that the area not formed by the triangles is equal in both arrangements.
9. In a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

4. Pre test

Q1. Given that $c^2 = a^2 + b^2$ and $a = 8$, $b = 15$, what is the value of c ?

- a. 17 b. 23 c. 289 d. 529

Q2. PYTHAGOREAN THEOREM states that for any right angled triangle called that.....

- a. Hypotenuse b. Hypochondriac c. Hypotenuse d. Hyperactive

5. Post test Assessments

Q1. The hypotenuse of a right angled triangle is opposite to the

- a. Acute angle b. Right angle c. Obtuse angle d. None of these

Q2. The length of the hypotenuse of a right triangle is 32 inches and the length of one of the legs is 18 inches. What is the length, to the nearest tenth of an inch, of the other leg of the triangle?

- a. 36.7 inches b. 28.4 inches c. 26.5 inches d. 25.4 inches

6. References:

1. en.wikipedia.org/wiki/Pythagorean_theorem
2. www.mathsisfun.com/pythagoras.html
3. www.mathwarehouse.com/.../how-to-use-the-pythagorean-theorem.php