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The Base Theory of the Right-Angled Triangle

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Short Communication

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ABSTRACT

In this research paper titled "The base theory of right-angled triangle". We used the concepts of trigonometry, determinant and Euclidean geometry. We tried to keep the work in the ordinary language of Geometry. It satisfies the proof of base theory and relation between the matrix and the lengths of the triangle.

The theorem is about the result of the product of hypotenuse and perpendicular side we get the base of a right-angled triangle. The matrices are of 2 by 2, elements have the length of the triangle and the process of the determinant is entertained for proof.

INTRODUCTION

The theorem is on basic geometrical concepts. We had performed many mathematical operations on a right triangle would further introduce the new theorem which is proved logically in mathematical sciences. The process embodies the determinant rule, AA postulate, Trigonometry functions, of geometry and algebra.

Statement of the theorem

The Difference between the product of base to the hypotenuse and perpendicular side each with base respectively of any right triangle is equal to the length of the base.

METHODOLOGY

Theorem 0.1: The difference between the product of the base to the hypotenuse and perpendicular side each with base respectively of any right triangle is equal to the length of the base.

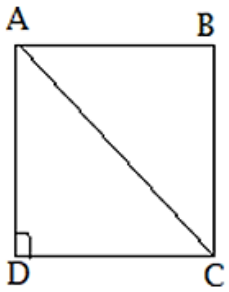

Figure 1. Quadrilateral ABCD

Given: In the figure 1 quadrilateral ABCD is square both triangles formed by diagonal AC are 45°-45°-90° triangles.

To prove: $a2.\ b1 - a1.\ b1 = b1$

Proof: segment AB = segment BC = segment CD = segment AD..... (All sides of squares are congruent)... (1)

In the rt. triangle ABC and rt. triangle ACD,

Segment AB // segment DC and segment BC // segment AD..... (Property of square)

Angle BAC ≅ angle ACD..... (Pair of alternate int. angles)

Angle ADC ≅ Angle ABC..... (Each 90°)

rt.triangle ABC ≈ rt. triangle ACD..... (AA postulate)

BC/AD..... (c.s.s.t)

BC/AB.... (Because AD=AB)(From 1).

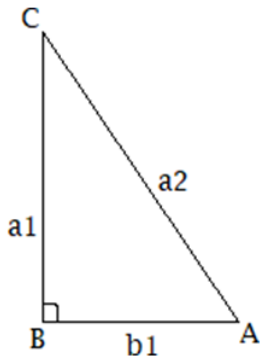

Figure 2. Right-angled triangle ABC

The second row, there should be the same variable $b1$ i.e. base of right-angle triangle ABC.

Lemma0.1: The perpendicular side of rt. triangle should be greater than base of the right-angled triangle. Proof:

In the figure 2 angle BAC < angle BCA,

BC > BA ..... (The side opposite to greater angle is greater than the side opposite to smaller angle).

i.e. a2 > a1

The Perpendicular side is a greater than base side of the right-angled triangle.

Lemma 0.2: In the matrix hypotenuse ($a2$) of the right-angled triangle should be the successor of perpendicular Side ($a1$) of the right-angled triangle.

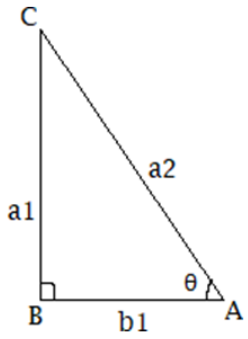

Figure 3. Right-angled triangle ABC

In the figure3: By Pythagoras theorem,

$$BC2 + AB2 = AC2$$

$$BC + AB = AC$$

RESULTS

The rt. triangle has a hypotenuse 7cm and perpendicular side is 6 cm and the base is 5cm.Show that the difference between the product of base to the hypotenuse and perpendicular side each with base respectively of any right-angled triangle is equal to the length of the base i.e. $A = a2.\ b1 - a1.\ b1 = b1$.

CONCLUSION

The theorem is about the result of the product of hypotenuse and perpendicular side we get the base of a right-angled triangle. The matrices are of 2 by 2, elements have the length of the triangle and the process of the determinant is entertained for proof.

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