Example of history of pythagorean theorem research paper

Parts of the World, Europe

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Introduction

Pythagoras theorem is named after a Greek mathematician Pythagoras who lived in 475BC. Despite the theorem being named after him, he was not the only ancient person who came up or probably used the theorem because the Babylonians and used it in ancient civilization. In the theorem Pythagoras creates a relationship between the hypotenuse and two sides of a right angled triangle as a2 + b2 = c2. Later on, mathematician from north Europe came up with Pythagoras triples to simplify on ways of obtaining sides of right angled triangles. As years went by, different mathematicians came up with different was of proofing the theorem thus diversifying the applicability of the theorem for example, in complex numbers. The theorem has also provided a link between different fields of mathematics (Rudman, 36).

This theorem goes by different names i. e Pythagoras' Theorem, Pythagorean Theorem, and notably Euclid I 47. This theorem is named after the Greek mathematician Pythagoras. Pythagoras was born around 569 BC in Samos, Ionia and lived up to 475 BC. He founded a school by the name semicircle of Pythagoras which offered studies in religion, philosophy, mathematics, and astronomy. This school is presently known as Crotone it is

located in southern Italy. History about Pythagoras remains scanty as information in ancient world was mainly passed from generation to generation through word of mouth. In addition, his school worked mainly as a unit and many related discoveries made which relate to the theory have been associated with Pythagoras just because he was the teacher. This has made it difficult for any historian to clearly distinguish the work of Pythagoras only from that of his students.

Despite acknowledging Pythagoras as the inventor of the Pythagorean Theorem, it is believed that the Babylonians used Pythagoras theorem many years before Pythagoras invention. The Babylonians used the theorem in Mesopotamia more than four thousand years ago. A tablet with identification ‘ YBC 7289’ was among the many discoveries which prove ancient use of the theorem by Babylonians. This tablet shows a tilted square with its two diagonals with marks indicating the length of its sides and diagonals. These lengths were translated into modern language to read ‘ four is the length and 5 is the diagonal. Find the breath? If its size is not known. 16 is 4 times 4 is and 25 is five times. If you take 16 from25 the difference is 9. What shall be taken in order to get 9? Definitely 9 is 3 times 3. Therefore, 3 is the breath ’’ (Maor, 24). Therefore, the Babylonians used the relationship between diagonal and length of a square in construction (even up to today the theorem is widely acknowledged in building and construction in all parts of the word).

The Egyptians also used this theorem in their agricultural activities along river Nile, and construction of pyramids. They knew that a triangle of sides3 units, 4 units and five units was right angled at the intersection of the side of

3 units and 4 units. They made use of a rope with twelve knots evenly distributed to simplify the application of the theorem. However, their knowledge on Pythagoras theorem was limited to the 3, 4, 5 triangle. In addition, it is achieved that Chinese mathematicians applied the theorem. In china the theory is documented to have been invented by Tschou-Gun who lived in 1100 BC (Carlson, 56).

Pythagoras discovery of the theorem was not in any way influenced by the earlier Babylonians discovery because both lived miles away. So Pythagoras stated his theory in terms of area unlike Babylonians' who stated it in terms of sides of a square. His theorem stated that, ' in any right triangle, the area of the square whose side is hypotenuse (the side opposite the right angle) is equal to the sum of the areas of squares whose sides are the two legs (the two sides that' meet at a right angle). He then demonistrated it as follows: Latter he came up with a summarized formulae of getting the hypotenuse which states that ' the square of hypotenuse of a right triangle is equal to the sum of the squares of the other two sides'' i. e. a2 + b2 = c2. This was obtained by logical thinking that, area of square A = a2, area of square B = b2 while that of square C= c2. To simplify the method of coming up with the three sides of right angled triangle ancient mathematicians in North Europe came up with Pythagorean triples. Whereby, three positive integers a, b, and c are used to form a Pythagorean triple which is written in form (a, b, c). The mathematicians then stated all possible right angled triangles with values less than 100 (Carlson, 44).

Latter, other proofs have been developed to proof the Pythagoras theorem. For example, the algebraic proofs, converse theorem, and the cosine rule. As

more and more proofs were developed the consequences and uses of Pythagorean Theorem diversified.

In modern mathematics the knowledge of Pythagoras is used in various mathematical disciplines. Firstly, it is applied in calculating incommensurable lengths. Where, the theorem knowledge makes it possible to logically construct incommensurable lengths because the sides of a right angled triangle have a square root relationship with the hypotenuse. Secondly, it is used in complex numbers where Z = x + I y, the modulus i. e. absolute length of z is got by Z2= x2 +y2. In the formulae of complex numbers Z is replaced with r to indicate radius because X and Y can assume either positive or negative values in the complex plane. Other uses include calculating distance between points in a Cartesian plane, Pythagorean trigonometric identity, and relation to cross product (Greenbury, 10). Pythagoras theorem has played a role in creation and development of many fields of mathematics. For example, its arithmetic form connects geometry to algebra. In this connection Leafed and Pythagorean tree are used in providing essential link between Pythagorean theorem and fractal geometry.

Conclusion

Pythagoras theorem is named after a Greek mathematician cum philosopher Pythagoras. Who lived in south Italy and headed a school which taught religion, philosophy astronomy and mathematics. Despite its name, Pythagoras was not the only mathematician who came up with this interesting mathematics concept because evidence indicates that the Babylonians, Egyptians and even the Chinese used Pythagoras theorem in

the early civilization. However, Pythagoras work was more profound. The theorem is based on the formulae a2 + b2 = c2 where c represents the length of hypotenuse, ‘ a’ and ‘ b’ represent the other sides of triangle intersecting at ninety degrees. Mathematicians in north Europe came up with Pythagoras triples where they stated all the possible right angled triangles with side’s length less than 100 units. Latter mathematicians came up with many ways of proving the theorem and this open the door for diversified application of the theorem. In modern mathematics, Pythagoras theorem has formed the basis of converse theorem, and the cosine rule in addition to, providing essential link between mathematics and algebra.

References

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