PROJECT

TITLE : Pythagorean Triples Checker

METHOD : To input the sides of any triangle in any order. Return whether the triangle is a Pythagorean Triple or not. Loop the program so the user can use it more than once without having to restart the program.

SUBMITTED : 20BAI4025

BY KIRUTHIKA S

What is a Pythagorean triple?

Pythagorean triple (PT) can be defined as a set of three positive whole numbers that perfectly satisfy the Pythagorean theorem: $a^2 + b^2 = c^2$.

This set of numbers are usually the three side lengths of a right triangle. Pythagorean triples are represented as: (a, b, c), where, a = one leg; b = another leg; and c = hypotenuse.

There are two types of Pythagorean triples:

- Primitive Pythagorean triples
- Non-primitive Pythagorean triples

Primitive Pythagorean triples

A primitive Pythagorean triple is a reduced set of the positive values of a, b, and c with a common factor other than 1. This type of triple is always composed of one even number and two odd numbers.

For example, (3, 4, 5) and (5, 12, 13) are examples of primitive Pythagorean triples because each set has a common factor of 1 and also satisfies the

Pythagorean theorem: $a^2 + b^2 = c^2$.

- **(3, 4, 5) → GCF =1**

$a^2 + b^2 = c^2$

$3^2 + 4^2 = 5^2$

9 + 16 = 25

25 = 25

- **(5, 12, 13) → GCF = 1**

$a^2 + b^2 = c^2$

$5^2 + 12^2 = 13^2$

25 + 144 = 169

169 = 169

CODE :

```
triangle= {"side1" : 17 "side2" : 5, "side3" : 8}
while True:
```

```
triangle["side1"]= int(input("enter a value for side 1 or 0 to quit:"))
if triangle["side1"] == 0:
        Break
else:
        triangle["side2"]= int(input("enter a value for side2:"))
        triangle["side3"]= int(input("enter a value for side 3:"))
          if triangle["side2"]< triangle["side1"] > triangle["side3"]:


                c = triangle ["side1"]
                b = triangle ["side2"]
                a = triangle ["side3"]
       Elif triangle["side1"] < triangle["side2"] > triangle["side3"]:
                c = triangle ["side2"]
                b = triangle ["side1"]
                a = triangle ["side3"]
        else:
                c = triangle["side3"]
                b = triangle["side2"]
                a = triangle["side1"]
                  if a**2 + b**2 == c**2:
                     print("You have a pythagorean triplet")
                  else:
```

```
                print("You donot have a pythagorean
triplet")
```

OUTPUT:

```
        You have a pythagorean triplet
```

LET'S CHECK HOW MANUALLY:

The longest side of the triangle is called hypotenuse. According to the Pythagorean theorem the square of the hypotenuse is equal to the sum of the square of the two other sides.

∴17^2=15^2+8^2

⇒15^2+8^2=225+64=289

⇒17^2=289

∴289=289

Hence these lengths are Pythagorean triples.