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Area and side measurement relation of two right angled triangle (Relation All Mathematics)

Deshmukh Sachin Sandipan
Corps of Signal (Indian Army), India.

Abstract: *In this research paper ,two right angled triangle relation explained with the help of formulas. This relation explained in two part i.e.* ***Area relation*** *and* ***Sidemeasurement relation****.Right angled triangle can be narrowed in segment and as like right angled triangle called Seg-right angled triangle.Seg-right angled triangle always become in zero area.*
Very feamas ***Pythagoras theoram*** *proof with the help of Relation All Mathematics methode. also we are given proof of* ***DGP theorem*** *i.e. "In a right angled triangle ,the square of hypoténuse is equal to the subtract of the square of the sidemeasurement and four times the area". We are trying to give a new concept "Relation All Mathematics" to the world .I am sure that this concept will be helpful in Agricultural, Engineering, Mathematical world etc.*
Keywords: *Area, Perimeter, Relation , Seg-right angled triangle , B- Sidemeasurement*

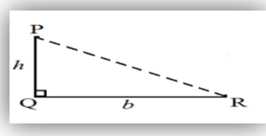
I. Introduction

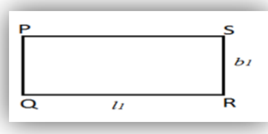
Relation All Mathematics is a new field and the various relations shown in this research, "Area and sidemeasurement relation of two right angled triangle" is a 2^{nd} research paper of Relation All Mathematics. and in future ,the research related to this concept, that must be part of " Relation Mathematics " subject. Here ,we have studied and shown new variables ,letters, concepts, relations ,and theorems.. Inside the research paper cleared that relation between two right angled triangle in two parts. i.e. i) Basic theorem of area relation of isosceles right angled triangle and scalene right angled triangle ii) Basic theorem of sidemeasurement relation of isosceles right angled triangle-scalene right angled triangle.. Sidemeasurement is a explained new concept which is very important related to this paper and Relation Mathematics subject.

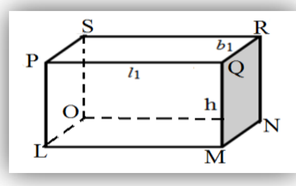
In this "Relation All Mathematics" we have proved the relation between rectangle-square and two right angled triangles with the help of formula . This relation is explained in two parts **i)Area relation** and ii) **Sidemeasurement relation** . Also we have proved ,the Theorem of right angled triangle whose height is zero i.e. Seg-right angled triangle theorem and along with the theorem of seg-right angled triangles ratio . In this research paper proof that Pythagoras theorem with the help of Relation All Mathematics method. Also we have proved DGP theorem i.e. In a right angled triangle, the square of hypotenuse is equal to the subtract of the squares of the side-measurement and four times the area .This "Relation All Mathematics" research work is near by 300 pages . This research is done considering the Agricultural sector mainly ,but I am sure that it will also be helpful in other sector also.

II. Basic concept of two right angled triangle

2.1. Sidemeasurement(B) :-If sides of any geometrical figure are in right angle with each other , then those sides or considering one of the parallel and equal sides after adding them, the addition is the sidemeasurement .side-measurement indicated with letter 'B'
Sidemeasurement is a one of the most important concept and maximum base of the Relation All Mathematics depend apoun this concept.







Sidemeasurement of right angled triangle - B (ΔPQR) = b+h
In **Δ**PQR ,sides PQ and QR are right angle, performed to each other .

Sidemeasurement of rectangle-B(□PQRS)= l_1+ b_1
In □PQRS, opposite sides PQ and RS are similar to each other and m<Q = 90^o .here side PQ and QR are right angle performed to each other.

Sidemeasurement of cuboid–E_B(□PQRS) = l_1+ b_1+ h_1
In E(□PQRS),opposite sides are parallel to each other and QM are right angle performed to each other. Sidemeasurement of cuboid written as = E_B(□PQRS)

2.2)Important points of square-rectangle relation :-
I) For explanation of square and rectangle relation following variables are used
i) Area – A
ii) Perimeter – P
iii) Sidemeasurement – B
II) For explanation of square and rectangle relation following letters are used
i) Area of square ABCD – A (□ABCD)
ii) Perimeter of square ABCD – P (□ABCD)
iii) Sidemeasurement of square ABCD – B (□ABCD)
iv) Area of rectangle PQRS – A (□PQRS)
v) Perimeter of rectangle PQRS – P (□PQRS)
vi) Sidemeasurement of rectangle PQRS – B (□PQRS)

II) For explanation of two right angled triangle relation, following letters are used
- In isosceles right angled triangle ΔABC [$45^0 – 45^0$- 90^0],side is assumed as 'l ' and hypotenuse as 'X'
- In scalene right angled triangle ΔPQR[$\boldsymbol{\theta}_1$– $\boldsymbol{\theta}_1'$ - 90^0] it`s base 'b_1' height 'h_1'and hypotenuse assumed as 'Y'
- In scalene right angled triangle ΔLMN[$\boldsymbol{\theta}_2$– $\boldsymbol{\theta}_2'$ - 90^0]it`s base 'b_2' height 'h_2'an hypotenuse assumed as 'Z'

i) Area of isosceles right angled triangle ABC – A (ΔABC)
ii) Side-measurement of isosceles right angled triangle ABC – B (ΔABC)
iii) Area of scalene right angled triangle PQR – A (ΔPQR)
vi) Sidemeasurement of scalene right angled triangle PQR – B (ΔPQR)

2.3) Important Reference theorem of previous paper which used in this paper:-
Theorem : Basic theorem of area relation of square and rectangle
Perimeter of square and rectangle is same then area of square is more than area of rectangle, at that time area of square is equal to sum of the, area of rectangle and Relation area formula of square-rectangle(K) .

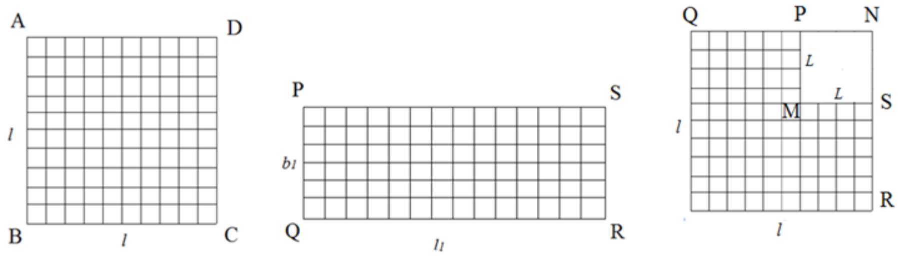


Figure I : Area relation of square and rectangle

Proof formula :- A(□ABCD) = A(□PQRS) + $\left[\frac{(l_1 + b_1)}{2} - b_1\right]^2$
[Note :- The proof of this formula given in previous paper and that available in reference**]**

Theorem :- Basic theorem of perimeter relation of square-rectangle
Area of square and rectangle is same then perimeter of rectangle is more than perimeter of square , at that time perimeter of rectangle is equal to product of the, perimeter of square and Relation perimeter formula of square-rectangle(V).

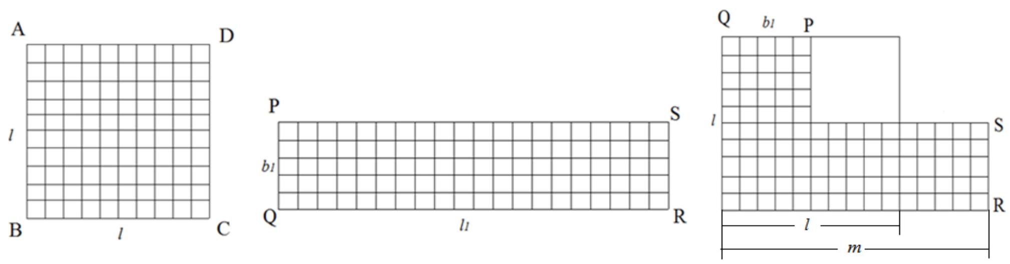


Figure II : Perimeter relation of square-rectangle

Proof formula :- P(□ PQRS)= P(□ABCD) x $\frac{1}{2}\left[\frac{(n^2+1)}{n}\right]$
[Note :- The proof of this formula given in previous paper and that available in reference**]**

Theorem -1: Basic theorem of area relation of isosceles right angled triangle and scalene right angled triangle. The Sidemeasurement of isosceles right angled triangle and scalene right angled triangle is same then area of isosceles right angled triangle is more than area of scalene right angled triangle, at that time area of isosceles right angled triangle is equal to sum of the, area of scalene right angled triangle and Relation area formula of isosceles right angled triangle - scalene right angled triangle(K`) .

Given :-Hypotenuse AC divided square (□ABCD) in two part, ΔABC = ΔADC
and in ΔABC,m∠B=90^0 as well as,
Hypotenuse PR divided rectangle (□PQRS) in two part, ΔPQR = ΔRSP
and in ΔPQR,m∠Q=90^0
here, B(ΔABC) = B(ΔPQR)
$2\,l = (b_1+h_1)$, $b_1 > l$

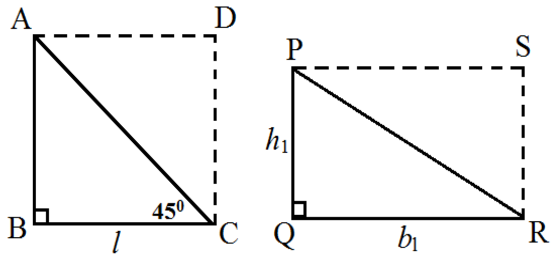


Figure III : Area relation of isosceles right angled triangle and scalene right angled triangle

To prove :- A(ΔABC) = A(ΔPQR) + $\frac{1}{2}\left[\frac{(b_1+h_1)}{2} - h_1\right]^2$
Proof :- In □ABCD and □PQRS,

A(□ABCD) = A(□PQRS) + $\left[\frac{(b_1+h_1)}{2} - h_1\right]^2$ … (i)
(Basic theorem of area relation of square and rectangle)

Divided both sides of eq^n (i) with 2

$\frac{A(□ABCD)}{2} = \frac{A(□PQRS)}{2} + \frac{K}{2}$ … (K-Relation area formula of square and rectangle)

A(ΔABC) = A(ΔPQR) + $\mathbf{\frac{1}{2}\left[\frac{(b_1+h_1)}{2} - h_1\right]^2}$ … here, K'= $\frac{K}{2} = \frac{1}{2}\left[\frac{(b_1+h_1)}{2} - h_1\right]^2$
- (Relation area formula of isosceles right angled triangle - scalene right angled triangle(K`)

A(ΔABC) = A(ΔPQR) +$\frac{1}{2}\left[\frac{\mathbf{(b_1-h_1)}}{\mathbf{2}}\right]^{\mathbf{2}}$

Hence Basic theorem of area relation of isosceles right angled triangle and scalene right angled triangle . is proved.

Example:-

		ΔABC	**ΔPQR**	**+ K'**	**REMARKS**
Given	**Base**	**10**	**14**		
	Height	**10**	**6**		
		LHS	**RHS**	**RHS**	
Explanation	**Sidemeasurement**	**20**	**20**		**Equal**
	area	**50**	**42**	**8**	
	Answer	**50**	**50**		**LHS=RHS**

Theorem-2 : Theorem of area relation of two scalene right angled triangles.
If sidemeasurement of two scalene right angled triangle is same then scalene right angled triangle whose base is smaller, its area also is more than another scalene right angled triangle.
Given :- In ΔABC, ΔPQR and ΔLMN,

B(ΔABC) = B(ΔPQR) = B(ΔLMN)

$2\,l = b_1+h_1 = b_2+h_2$ … $b_1<b_2$

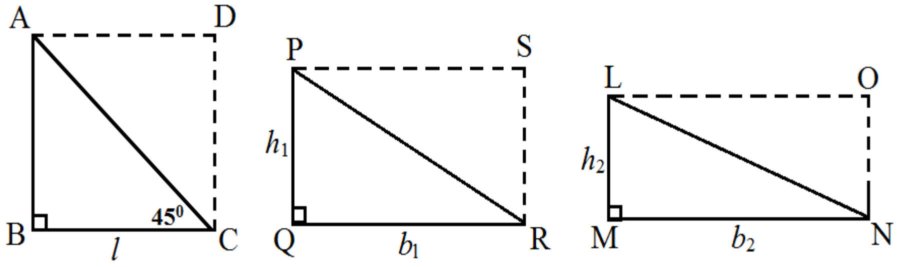


Figure IV: Area relation of two scalene right angled triangles

To prove :- $A(\Delta PQR) = A(\Delta LMN) + \frac{1}{2}(h_1-h_2).\,[(b_1+h_1) - (h_1+h_2)]$

Proof :- In ΔABC and ΔPQR,

$$A(\Delta ABC) = A(\Delta PQR) + \frac{1}{2}\left[\frac{(b_1+h_1)}{2} - h_1\right]^2 \quad \ldots(i)$$

... (Basic theorem of area relation of isosceles right angled triangle and scalene right angled triangle)

In ΔABC and ΔLMN,

$$A(\Delta ABC) = A(\Delta LMN) + \frac{1}{2}\left[\frac{(b_2+h_2)}{2} - h_2\right]^2 \quad \ldots(ii)$$

... (Basic theorem of area relation of isosceles right angled triangle and scalene right angled triangle)

$$A(\Delta PQR) + \frac{1}{2}\left[\frac{(b_1+h_1)}{2} - h_1\right]^2 = A(\Delta LMN) + \frac{1}{2}\left[\frac{(b_2+h_2)}{2} - h_2\right]^2 \quad \ldots\text{From equation no.(i) and (ii)}$$

$$A(\Delta PQR) = A(\Delta LMN) + \frac{1}{2}\left[\frac{(b_2+h_2)}{2} - h_2\right]^2 - \frac{1}{2}\left[\frac{(b_1+h_1)}{2} - h_1\right]^2$$

$$= A(\Delta LMN) + \frac{1}{2}\left[\frac{(b_2+h_2)}{2} - h_2 + \frac{(b_1+h_1)}{2} - h_1\right] \text{x} \left[\frac{(b_2+h_2)}{2} - h_2 - \frac{(b_1+h_1)}{2} + h_1\right]$$

…$(a^2-b^2) = (a+b).(a-b)$, $b_1+h_1 = b_2+h_2$ …(Given)

$$\mathbf{A(\Delta PQR) = A(\Delta LMN) + \frac{1}{2}(h_1-h_2).\,[(b_1+h_1) - (h_1+h_2)]}$$

.Hence , Theorem of area relation of two scalene right angled triangles is proved.

Theorem-3: Basic theorem of sidemeasurement relation of isosceles right angled triangle and scalene right angled triangle.
Area of isosceles right angled triangle and scalene right angled triangle is same then sidemeasurement of scalene right angled triangle is more than sidemeasurement of isosceles right angled triangle , at that time sidemeasurement of scalene right angled triangle is equal to product of the, sidemeasurement of isosceles right angled triangle and Relation sidemeasurement formula of isosceles right angled triangle-scalene right angled triangle(V').

Given :- Hypotenuse AC divided square (□ABCD) in two part, ΔABC = ΔADC

and in ΔABC,m∠B=90^0 as will as,

Hypotenuse PR divided rectangle(□PQRS) in two part, ΔPQR = ΔRSP

and in ΔPQR,m∠Q=900

here, A(ΔABC) = A(ΔPQR)

$l^2 = b_1 \text{ x } h_1$, $b_1 > l$

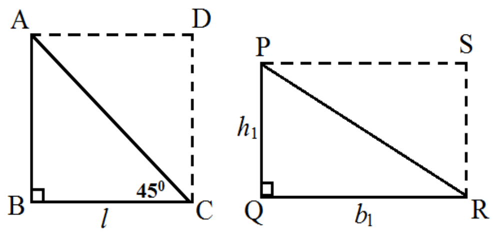


Figure V: Sidemeasurement relation of isosceles right angled triangle-scalene right angled triangle

To prove :- B(ΔPQR)= B(ΔABC) x $\frac{1}{2}\left[\frac{(n^2+1)}{n}\right]$

Proof :- In □ABCD and □PQRS,

P(□PQRS) = $\frac{1}{2}$ P(□ABCD) x $\left[\frac{(n^2+1)}{n}\right]$ … (i) Basic theorem of perimeter relation of square-rectangle)

Divided both sides of eq^n (i) with 2

$\frac{P(□PQRS)}{2} = \frac{P(□ABCD)}{2} \text{ x } \frac{V}{2}$ … V - (relation perimeter formula of square and rectangle)

B(ΔPQR) = B(ΔABC) x $\frac{V}{2}$

B(ΔPQR) = B(ΔABC) x V'

B(Δ PQR) = $\frac{1}{2}$ B(ΔABC) x $\left[\frac{(n^2+1)}{n}\right]$

Hence , Basic theorem of sidemeasurement relation of isosceles right angled triangle-scalene right angled . triangle is proved.

Example:-

		ΔPQR	ΔABC	x V'	REMARKS
Given	Base	20	10		
	Height	5	10		
		LHS	RHS	RHS	
Explanation	Area	50	50		Equal
	Sidemeasurement	25	20	$\frac{2.5}{2}$	
	Answer	25	25		LHS=RHS

Theorem-4 : Theorem of sidemeasurement relation between two scalene right angled triangles .

If area of two scalene right angled triangle is same then scalene right angled triangle whose length is more, its sidemeasurement also is more than another scalene right angled triangle.

Given :- In ΔABC, ΔPQR and ΔLMN,

A(ΔABC)= A(ΔPQR) = A(ΔLMN)

Here, $b_1 \times h_1 = b_2 \times h_2$ …$b_1 < b_2$

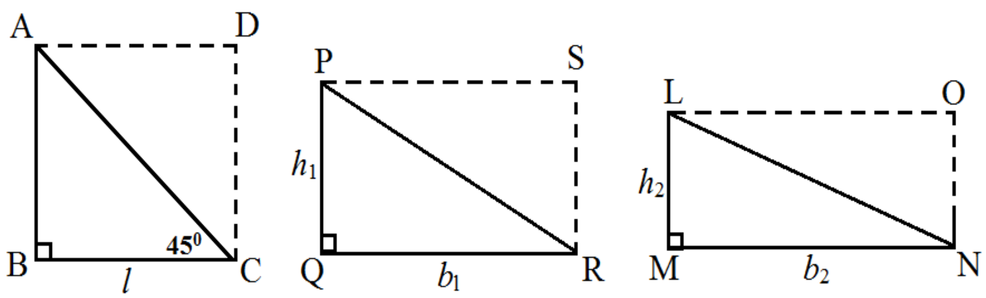


Figure VI: Sidemeasurement relation between two scalene right angled triangles

To prove :- P(ΔPQR) = P(ΔLMN) x $\left[\frac{n_2}{n_1} \cdot \frac{(n_1{}^2+1)}{(n_2{}^2+1)}\right]$

Proof :- In ΔABC and ΔPQR ,

B(ΔABC)=B(ΔPQR) x 2$\left[\frac{n_1}{(n_1{}^2+1)}\right]$ …(i)

…(Basic theorem of sidemeasurement relation of isosceles right angled triangle-scalene right angled triangle)

In ΔABC and ΔPQR,

B(ΔABC) = B(ΔLMN) x 2. $\left[\frac{n_2}{(n_2{}^2+1)}\right]$ …(ii)

… (Basic theorem of sidemeasurement relation of isosceles right angled triangle-scalene right angled triangle)

B(ΔPQR) x 2 $\left[\frac{n_1}{(n_1{}^2+1)}\right]$ = B(ΔLMN) x 2 . $\left[\frac{n_2}{(n_2{}^2+1)}\right]$ … From equation no. (i) and (ii)

$$B(\Delta PQR) = B(\Delta LMN) \times \left[\frac{(n_1{}^2+1)}{n_1}\right].\left[\frac{n_2}{(n_2{}^2+1)}\right]$$

$$B(\Delta PQR) = B(\Delta LMN) \times \left[\frac{n_2}{n_1}.\frac{(n_1{}^2+1)}{(n_2{}^2+1)}\right]$$

Hence , Theorem of sidemeasurement relation between two scalene right angled triangles is proved.

Theorem-5 : Seg- right angled triangle theorem.

If sidemeasurement of right angled triangle is kept constant and base is increased till height become zero ,then become Segment is Seg- right angled triangle.

Given :- In ΔABC

$B(\Delta ABC) = (b_1+h_1) = B(\text{Seg AB-CD})$

Now in $\Delta AB\text{-}C$,become a base = 2 l … (height = 0)

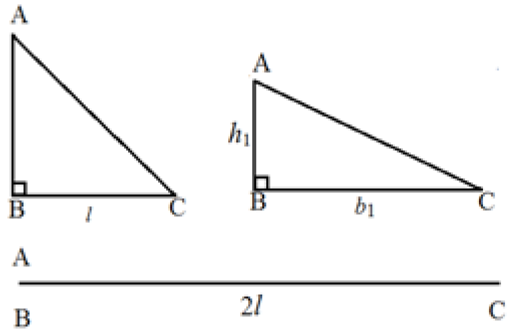


Figure VII: Segment AB-C is Seg- right angled triangle

To prove :- Seg AB-C is Seg- right angled triangle

Proof :- In ΔABC ,

$A(\Delta ABC) = \frac{1}{2} l^2$ … (i)

In Segment AB-C, $h_1 = 0$

Suppose, Segment AB-C is right angled triangle

Now , In Seg AB-C,

A(Seg AB-C)= O …(ii) ($h_1 = 0$) … Given

$A(\Delta ABC) = A(\text{Seg AB-C}) + \frac{1}{2}\left[\frac{(b_1+h_1)}{2} - h_1\right]^2$

… (Basic theorem of relation of area of isosceles right angled triangle and scalene right angled triangle)

$= 2\,l \times 0 + \frac{1}{2}\left[\frac{(2l+0)}{2} - 0\right]^2$

$= 0 + \frac{1}{2}\left[\frac{2l}{2}\right]^2$

$A(\Delta ABC) = \frac{1}{2}\ l^2$

But this equation is satisfied with Basic theorem of area relation of isosceles right angled triangle and . scalene right angled triangle.

Hence , Seg- right angled triangle theorem is proved.

(Seg AB-C is Seg-scalene right angled triangle , and it can be written as $\Delta AB\text{-}C$)

Theorem- 6: Theorem of Seg- right angled triangles ratio

The sidemeasurement of two seg-right angled triangle is equal to the ratio of base of that seg –right angled triangle..

Given :- In $\Delta PQ\text{-}R$ and $\Delta LM\text{-}N$,

$h_1 = h_2 = 0$, $[A(\Delta PQ\text{-}R) = A(\Delta LM\text{-}N) = 0]$

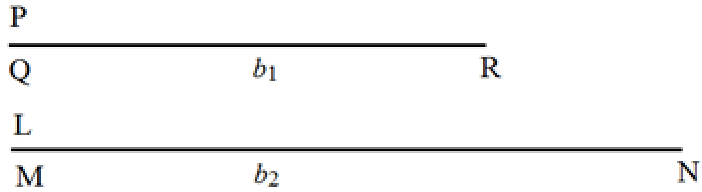


Figure VIII: Seg- right angled triangles ratio

To prove :- B(ΔPQ-R) : B(ΔLM-N) = $b_1 : b_2$

Proof :- In ΔPQ-R and ΔLM-N ,

P(ΔPQ-R)= P(ΔLM-N) x $\left[\frac{n_2}{n_1} . \frac{(n_1{}^2+1)}{(n_2{}^2+1)}\right]$… (Theorem of sidemeasurement relation between two right angled triangles)

P(ΔPQ-R) = P(ΔLM-N) x $\left[\frac{b_2}{b_1} \quad \frac{(b_1^2+l^2}{(b_2^2+l^2)}\right]$ …$l^2 = l_1 . h_1$

P(ΔPQR) = P(ΔLMN) x $\left[\frac{b_2}{b_1} \quad \frac{(b_1^2)}{(b_2^2)}\right]$ … ($h_1 = h_2 = 0$, Given)

P(ΔPQR) = P(ΔLMN) x $\frac{b_1}{b_2}$

$$\frac{P(\Delta PQR)}{P(\Delta LMN)} = \frac{b_1}{b_2}$$

P(ΔPQR) : P(ΔLMN) = $b_1 : b_2$

Hence , Theorem of Seg- right angled triangle ratio is proved.

Theorem- 7: Proof of **Pythagoras theorem** with the help of Relation All Mathematics Method :
The square of the hypotenuse of a right angled triangle is equal to the sum of the squares of the other two sides.
Given :- In ΔPQR, M∠PQR=90^0 , base (QR)= b_1 ,height (PQ) = h_1, And hypotenuse (PR) = x

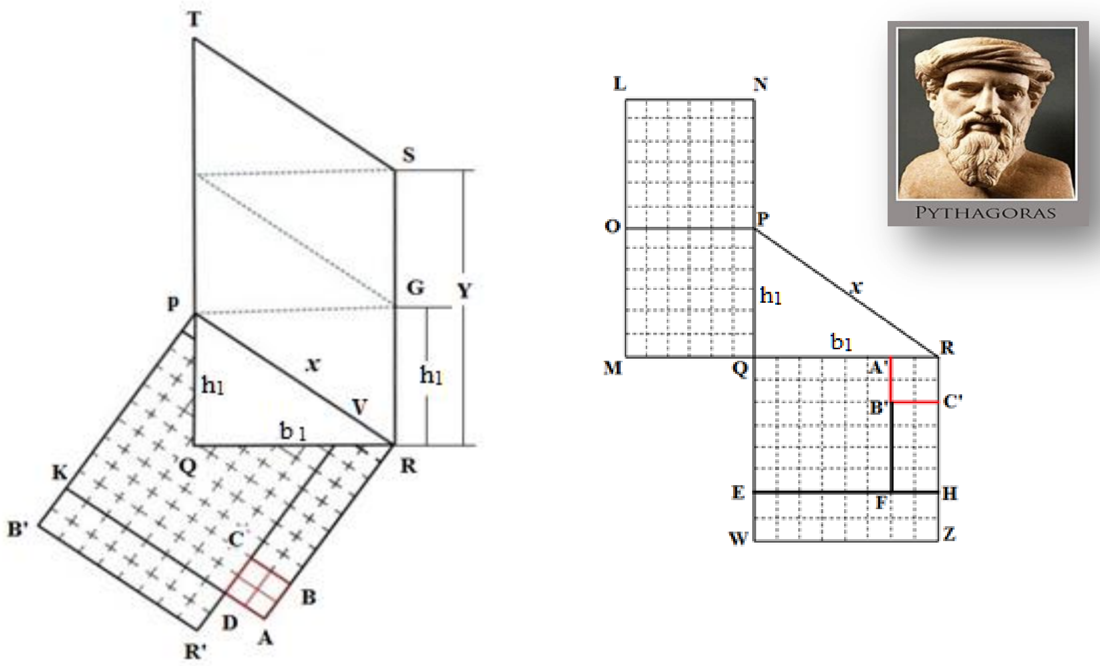


Figure IX: Pythagoras theorem with Relation All Mathematics

Construction :- Draw a parallelogram on hypotenuse (PR) as a,
y=2 h_1 ,Seg PG ⊥ Seg RS
so that , A(□PRST) = 4 .A(ΔPQR)

as shown in fig(I)

To proof :- $x^2 = b_1^2 + h_1^2$
Proof :- In □PRST,
A(□PRST) =PG X RS
$= b_1 \text{ X } 2 h_1$
$= 2 b_1.h_1$
A(□PRST) = 4.A(ΔPQR) = $2 b_1.h_1$ … (i)
Now we are draw square □PKAR with side PR, and parallelogram □PRST put on square □PKAR , which explained as bellow,
In fig –(I)
A(□RBCV) = A(□KDR`B`)
Now in □PRST and □PVR`B`,
PV=PG & PB`=RS
A(□PRST) = A(□PVR`B`) … (ii)
In □PKAR,
A(□PKAR) = x^2
A(□PKAR)= A(□PVR`B`)+ A(□ABCD)
$x^2 = 2 b_1h_1$ + A(□ABCD) … (iii)
In fig -2
In ΔPQR ,
Draw as ,A square □QWZR and □POMQ with base (QR) and height (PQ) respectively
New square □POMQ put on square □QWZR as explained as bellow.
A(□POMQ) = A(□QEFA`)
As will as ΔPQR set on square □QWZR as bellow
A(ΔPQR) = A(□EWZH + A(□FHC`B`)
Now in A(□QWZR)
A(□QWZR) = A(□QEFA`) + A(□EWZH) + A(□FHC`B`) + A(□A`B`C`R)
$b_1^2 = h_1^2$+ A(ΔPQR) + A(□A`B`C`R)
A(□A`B`C`R)= $b_1^2 - h_1^2 - \frac{b_1.h_1}{2}$ … (iv)
But the fig – 1 and 2
A(□ABCD) = A(□A`B`C`R) … (v)
Now in fig – 2 draw a □LMQN as
A(□LMQN) = 2 .A(□POMQ)
$=2 .h_1^2$
But,
A (□LMQN) = 3.A (ΔPQR)
$2 h_1^2 = 3 . \frac{b_1.h_1}{2}$ … (vi)
Now, value of equation –(iv) put on equation no. –(iii)
$x^2 = 2 b_1h_1$ + A(□ABCD)
$x^2 = 2 b_1h_1$ + A(□A`B`C`R) … A(□ABCD) = A(□A`B`C`R)
$= 2 b_1h_1 + b_1^2 - h_1^2 - \frac{b_1.h_1}{2}$ …From eq^n no. (iv)
$= b_1^2 + h_1^2 - h_1^2 - h_1^2 + 2 b_1h_1 - \frac{b_1.h_1}{2}$
$= b_1^2 + h_1^2 - 2 h_1^2 + 3 \frac{b_1.h_1}{2}$
$= b_1^2 + h_1^2 - 3 \frac{b_1.h_1}{2} + 3 \frac{b_1.h_1}{2}$ … (vi)[$2 h_1^2 = 3. \frac{b_1.h_1}{2}$]
$x^2 = b_1^2 + h_1^2$
Hence proof, the square of the hypotenuse of a right angled triangle is equal to the sum of the squares of the other two sides.

Theorem- 8: Theorem of proof of hypotenuse through the sidemeasurement and area.
[This theorem is also called DGP THEOREM]

In a right angled triangle, the square of hypotenuse is equal to the subtract of the squares of the sidemeasurement and four times the area.

Given :- In ΔPQR, M∠PQR=90^0
base (QR)= b_1 ,height (PQ) = h_1
And hypotenuse (PR) = Y

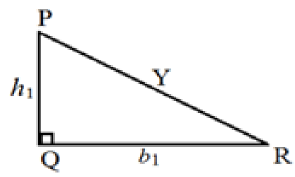


Figure (X) : DGP Theorem

To proof :- $Y^2 = B(\Delta PQR)^2 - 4.A(\Delta PQR)$

Proof :- In ΔPQR,

$Y^2 = b_1^2 + h_1^2$ … (Pythagoras theorem)

$Y^2 = b_1^2 + h_1^2 + 2\,b_1h_1 - 2\,b_1h_1$

$Y^2 = (b_1 + h_1)^2 - 2\,b_1h_1$ …$(a+b)^2 = a^2 + b^2 + 2ab$

$Y^2 = (b_1 + h_1)^2 - 4.\,(\frac{1}{2}.\,b_1h_1)$

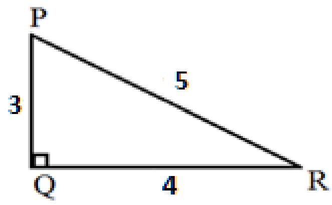
$Y^2 = B(\Delta PQR)^2 - 4.\,A(\Delta PQR)$

Hence, we are proof that DGP theorem.

[Note-DGP is a name of my Grandfather ,**D**hanaji **G**anapati **P**atil]

Example of DGP theorem:-

In ΔPQR , $M\angle PQR=90^0$, Base (QR)= 4 ,Height (PQ) = 3 , And Hypotenuse (PR) = 5 then give proof of DGP theorem ?



ANS:-

Given-In ΔPQR, $M\angle Q=90^0$, b_1 (QR)= 4 , h_1 (PQ) = 3

And Y (PR) = 5 then proof LHS=RHS.

$B(\Delta PQR) = b_1 + h_1$

$= 4+3$

$= 7$

Sidemeasurement of ΔPQR is 7

$A(\Delta PQR) = \frac{1}{2}.\,b_1h_1$

$= \frac{1}{2}.x\ 4x3$

$=6$

Area of ΔPQR is 6

$Y^2 = B(\Delta PQR)^2 - 4.\,A(\Delta PQR)$ … (DGP Theorem)

$5^2 = 7^2 - (4x6)$

$25 = 49 - 24$

$25 = 25$

LHS=RHS

So ,here this example given proof of DGP theorem .

Theorem- 8-i): Proof of base through the side-measurement and area.

In ΔPQR, $M\angle PQR=90^0$

base (QR)= b_1 ,height (PQ) = h_1

And hypotenuse (PR) = Y

Now ,in Fig.- (X)

we are know that,

$Y^2 = B(\Delta PQR)^2 - 4.\,A(\Delta PQR)$ … (DGP theorem)

$b_1^2 \sec^2\boldsymbol{\theta} = B(\Delta PQR)^2 - 4.\,A(\Delta PQR)$

$b_1^2 = \frac{[\,B(\Delta PQR\,)^2 - 4.A(\Delta PQR\,)]}{\sec^2\boldsymbol{\theta}}$

Theorem- 8-ii): Proof of height through the side-measurement and area.

In ΔPQR, $M\angle PQR=90^0$

base (QR)= b_1 ,height (PQ) = h_1

And hypotenuse (PR) = Y

Now ,in Fig. – (X)

We are know that,

$Y^2 = B(\Delta PQR)^2 - 4.\,A(\Delta PQR)$ … (DGP theorem)

$h_1^2 \operatorname{cosec}^2\boldsymbol{\theta} = B(\Delta PQR)^2 - 4.A(\Delta PQR)$

$h_1^2 = \frac{[\,B(\Delta PQR\,)^2 - 4.A(\Delta PQR\,)]}{\operatorname{cosec}^2\boldsymbol{\theta}}$

References

[1]. Surrounding agricultural life.

[2]. Answers.yahoo.com (www.answers.yahoo.com)

[3]. Wikipedia , Google and other search engines. (www.wikipedia.org)

[4]. This paper is next part of previous paper "Area and perimeter relation of square and rectangle(Relation All Mathematics)" DOI:10.9790/5728-10660107 , [http://iosrjournals.org/iosr-jm/pages/v10(6)Version-6.html]