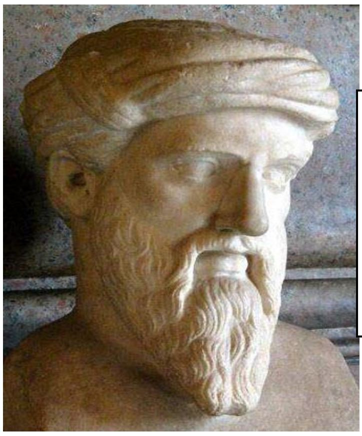
$L^{wr.}$ $2^{nd'ry}$ Maths Made Easy

Name : .... No : ....
Class : ....
Date : ....

Pythagoras' Theorem:

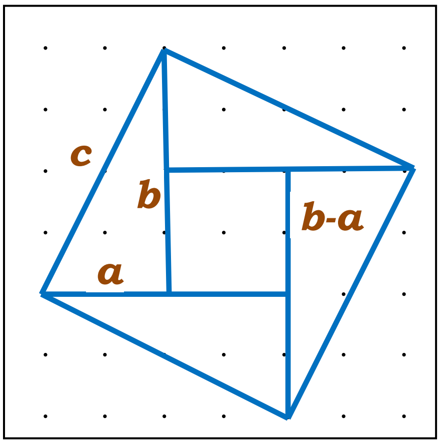


Italiano: Busto di Pitagora. Copia romana di originale greco. Musei Capitolini, Roma.Brüste des Philosophen Pythagoras von Samos in den Kapitolinischen Museen, de:Palazzo Nuovo; de:Rom Fotograf oder Zeichner: Galilea Copyright Status: de:GNU Freie Dokumentationslizenz

Algebraic Proofs

INSTRUCTION : Do these on the worksheet, but using a 7 x 7 nail geoboard as well will make them easier to understand

Algebraic Proof #1



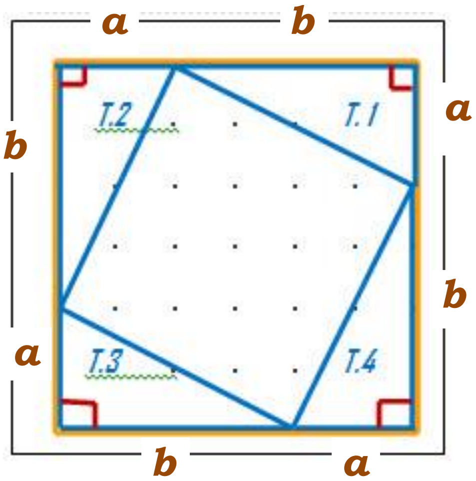
Make a right triangle, then 3 identical right triangles, each at 90^0 to its adjacent

Let's call the shortest side **a**. The area of the large square formed will be $\mathbf{c^2}$

Now equate $\mathbf{c^2}$ to the sum of the **5** areas (1 square plus 4 triangles)

$c^2 \quad =$

Algebraic Proof #2



Make a right triangle, then rotate it about the centre nail (order 4)

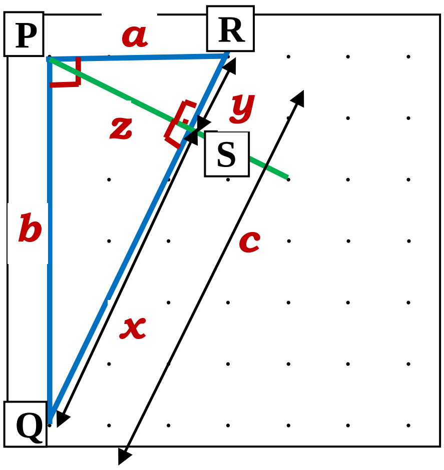
A large square is formed. Let the shortest side be **a**.

Equate the total area of the square $\mathbf{(a + b)^2}$ to the sum of **5** areas within it

(4 triangles and 1 square)

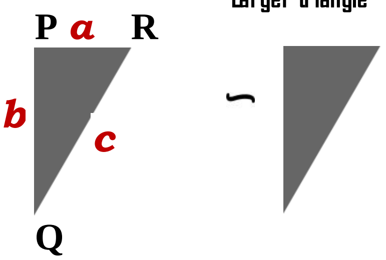
$(a + b)^2 \qquad =$

Algebraic Proof #3 (using similar triangles)



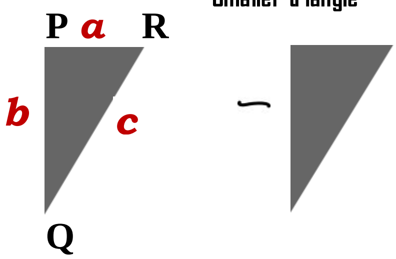
▲PQR ∽ ▲ _ _ _ (_ _ _)

Larger triangle



▲PQR ∽ ▲ _ _ _ (_ _ _)

Smaller triangle



Label the similar triangles above with points (large letters) and sides (small letters)

Then make a ratio : $\frac{b}{c}$ =

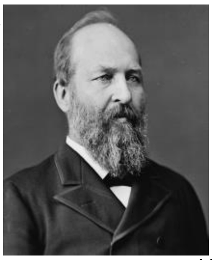
Cross Multiply :

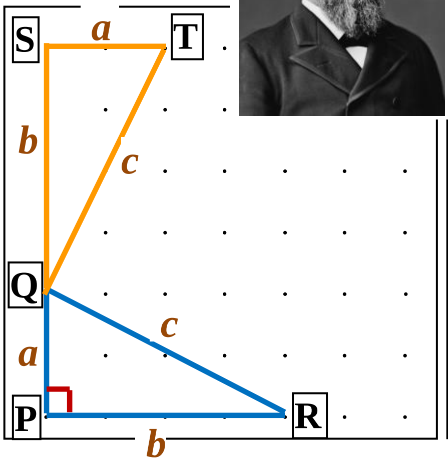
Then make a ratio : $\frac{a}{c}$ =

Cross Multiply :

Add the two equations:

James A. Garfield (1831 – 1881), 20th president of USA (1881), loved Mathematics, and is credited with this proof. Brady-Handy photograph of Garfield, via Wiki



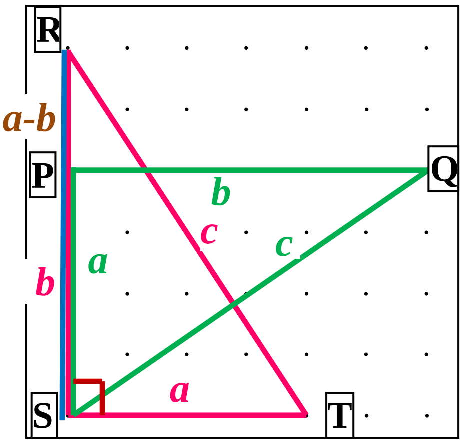


Garfield's Algebraic Proof #4

▲**QST** is constructed by a 90^0 clockwise slide rotation about **P** of ▲**RPQ**

What is the measure of angle **TQR** ? *Ans :* .... degrees. Draw **TR.**

Equate the area of the trapezium/trapezoid to the area sum of the 3 triangles.



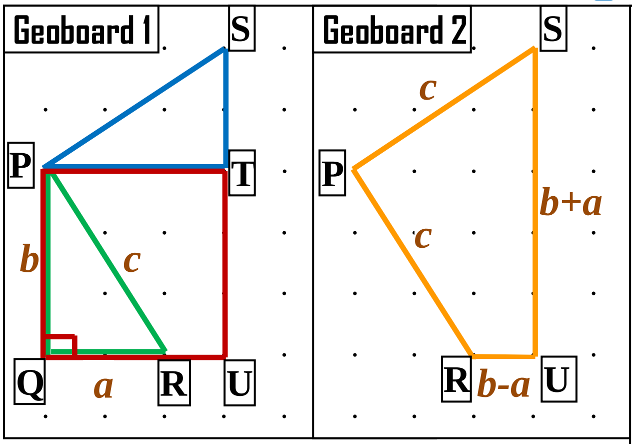
Algebraic Proof #5

Right ▲**SRT** is slide rotated 90^0 clockwise about **S** to become ▲**PQS**

Draw **RQ** and **QT**

Equate the area of Quadrilateral **SRQT** to ▲**SQT** plus ▲**RQS.**

Algebraic Proof #6



Geoboard 1 : Make a right triangle and form b^2 as shown

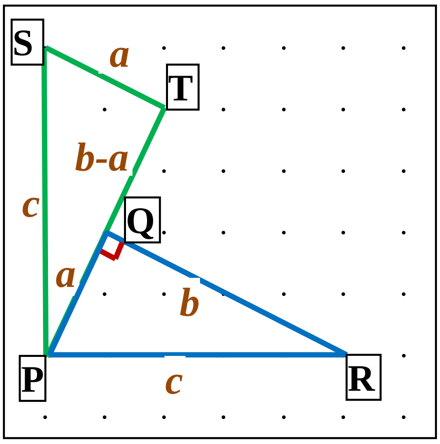
Rotate ▲**PQR** 90^0 anti-clockwise about **P** to be ▲**PTS**

Geoboard 2 : Remove ▲**PQR,** now the enclosed area is still b^2

Draw **SR.** Equate b^2 to the sum of ▲**RPS** and ▲**RSU**

b^2 =

Algebraic Proof #7



▲**STP** is constructed by a 90^0 clockwise slide rotation about **P** of ▲**PQR**

Draw **TR** and **SR.** Express these areas as different triangles and equate them

▲**PQR** + ▲**STP** + ▲**TQR** = ▲**SRP** + ▲**SRT**