Resolució d'un triangle coneguts tres costats. Teorema del cosinus

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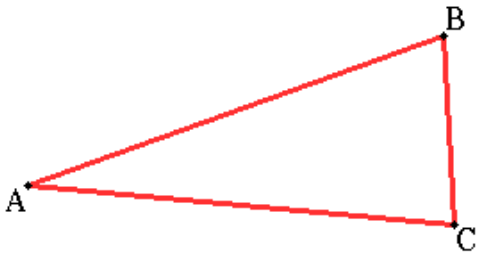
Donat un triangle $\overset{\Delta}{ABC}$ de costats coneguts $\overline{BC}=a$, $\overline{AC}=b$, $\overline{AB}=c$:

$a^2=b^2+c^2-2bc\cdot\cos A$. $A=\arccos\left(\frac{a^2-b^2-c^2}{-2bc}\right)$.

$b^2=a^2+c^2-2ac\cdot\cos B$. $B=\arccos\left(\frac{b^2-a^2-c^2}{-2ac}\right)$.

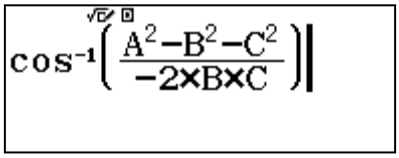
$c^2=a^2+b^2-2ab\cdot\cos C$. $C=\arccos\left(\frac{c^2-a^2-b^2}{-2ab}\right)$.

Exemple:
Resoleu el triangle de costats $a=15$, $b=34$, $c=35$.



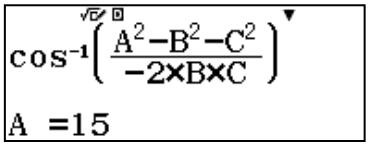
Introduïu la fórmula en la calculadora:

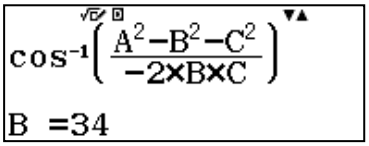
SHIFT cos (ALPHA (−) x^2 − ALPHA) x^2 − ALPHA x^{-1} x^2 ▼ − 2 × ALPHA) × ALPHA x^{-1} ▶)

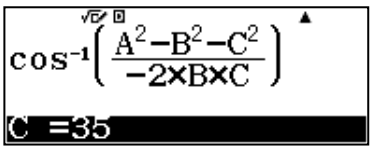


Calculeu l'angle A:

CALC 1 5 = 3 4 = 3 5 = =)







$$\cos^{-1}\left(\frac{A^2-B^2-C^2}{-2\times B\times C}\right)$$

25.05761542

$$\cos^{-1}\left(\frac{A^2-B^2-C^2}{-2\times B\times C}\right)$$

25° 3' 27.42"

A = 25º 3' 27.42".

Calculeu l'angle B:

CALC 3 4 = 1 5 = 3 5 = = °,,,

$$\cos^{-1}\left(\frac{A^2-B^2-C^2}{-2\times B\times C}\right)$$

73° 44' 23.26"

B = 73º 44' 23.26"

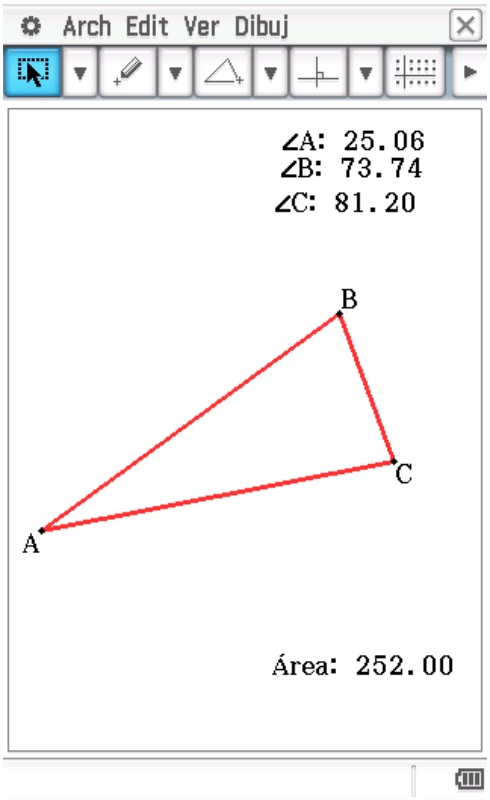
Calculeu l'angle C:

CALC 3 5 = 1 5 = 3 4 = = °,,,

$$\cos^{-1}\left(\frac{A^2-B^2-C^2}{-2\times B\times C}\right)$$

81° 12' 9.32"

C = 81º 12' 9.32".



Exercicis

Resoleu els següents triangles:

a) a = 15cm, b = 25cm, c = 35cm.

b) a = 7cm, b = 8cm, c = 9cm.

c) a = 15cm, b = 15cm, c = 20cm.

d) a = 5cm, b = 12cm, c = 13cm.