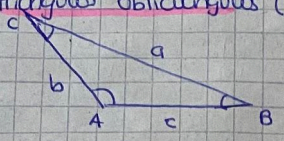
2)

Teorema del Coseno.

Se usan en triángulos oblicuangulos (no son rectangulos).



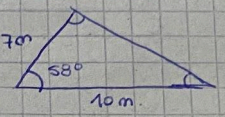
Se usa el teorema del Coseno cuando se conoce
- Lado - Angulo - Lado (LAL)
- Lado - Lado - Lado (LLL)

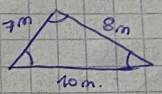
$a^2 = b^2 + c^2 - 2bc\cos A$

$b^2 = a^2 + c^2 - 2ac\cos B$

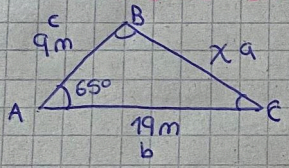
$c^2 = a^2 + b^2 - 2ab\cos C.$

Ej:





hallar un lado.



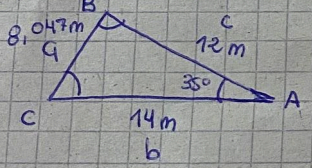
$a^2 = b^2 + c^2 - 2.b.c.\cos A$

$x^2 = 19^2 + 9^2 - 2.19.9.\cos 65°$

$\sqrt{x^2} = \sqrt{19^2 + 9^2 - 2.19.9.\cos 65°}$

$x = 17,247\ m.$

Práctica:

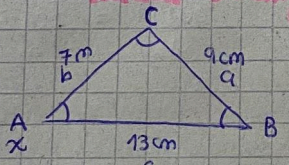


$a^2 = b^2 + c^2 - 2.b.c.\cos A$

$\sqrt{x^2} = \sqrt{14^2 + 12^2 - 2.14.12.\cos 35°}$

$x = 8,047\ m.$

hallar un ángulo.



$a^2 = b^2 + c^2 - 2.b.c.\cos A$ (① ② ③)

$a^2 - b^2 - c^2 = -2.b.c.\cos A.$

$\frac{a^2 - b^2 - c^2}{-2.b.c} = \cos A$

$\cos^{-1}\left(\frac{a^2 - b^2 - c^2}{-2.b.c}\right) = A$

$\cos^{-1}\left(\frac{9^2 - 7^2 - 13^2}{-2.7.13}\right) = A$

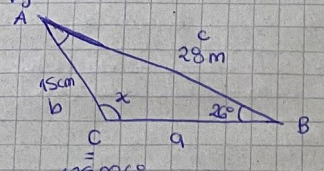
$41,17° = A$

$41° 10' 15,9'' = x$

HOJA N°

FECHA

Ej 2:



$B = 26°$
$b = 15\,cm$
$c = 28\,cm$
$C = x$

$\frac{Sen\,B}{b} = \frac{Sen\,C}{c}$

$\frac{Sen\,26°}{15cm} = \frac{Sen\,C}{28cm}$

$Sen^{-1}\left(\frac{28cm \cdot Sen\,26°}{15cm}\right) = C$

$54,914° = C$

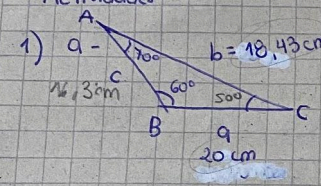
$C = 180° - 54,914°$

$C = 125,086°$

$= 125,086°$

Actividades:

1) a -



$A = 70°$
$a = 20\,cm$
$B = 60°$
$b = ?$
$C = ? \; 50°$
$c = ?$

$\frac{a}{Sen\,A} = \frac{b}{Sen\,B}$

$\frac{20cm}{Sen\,70°} = \frac{b}{Sen\,60°}$

$\frac{Sen\,60° \cdot 20cm}{Sen\,70°} = b$

$18,43cm = b$

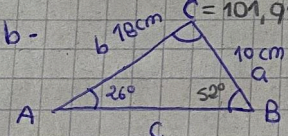
$\frac{a}{Sen\,A} = \frac{b}{Sen\,B}$ $\quad \frac{a}{Sen\,A} = \frac{c}{Sen\,C}$

$\frac{20cm}{Sen\,70°} = \frac{c}{Sen\,50°}$

$\frac{Sen\,50° \cdot 20cm}{Sen\,70°} = C$

$16,30° = C$

b -



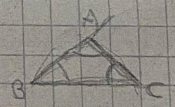
$A = 26°$
$a = 10\,cm$
$b = 18\,cm$
$B = ?$
$C = ?$
$c = ?$

$180 - 26 - 52,09 = 101,91°$

$\frac{a}{Sen\,A} = \frac{C}{Sen\,C} \rightarrow \frac{10cm}{Sen\,26°} = \frac{c}{Sen\,101,91°}$

$\frac{Sen\,101,91° \cdot 10cm}{Sen\,26°} = c$

$22,32cm = c$



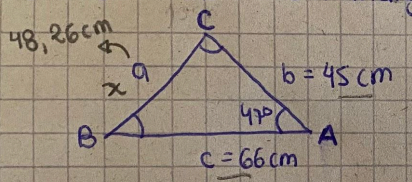
$\frac{Sen\,A}{a} = \frac{Sen\,B}{b}$

$\frac{Sen\,26°}{10cm} = \frac{Sen\,B}{18cm}$

$Sen^{-1}\left(\frac{18cm \cdot Sen\,26°}{10cm}\right) = B$

$52,09° = B$

3) Se tiene un triángulo cuyos lados b y c miden 45 y 66 cm, cuyo ángulo A mide 47°. ¿Cuánto mide el lado a del triángulo?



A = 47°
a = ?
b = 45 cm
c = 66 cm

$a^2 = b^2 + c^2 - 2.b.c.\cos A$

$x = \sqrt{45^2 + 66^2 - 2.45.66.\cos 47°}$

$x = 48,26\ cm$

Rta= el lado a de triángulo mide 48,26 cm.

NOTA