

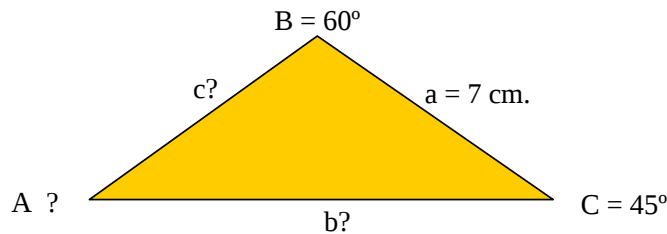
## ACTIVIDADES. Resolución de triángulos oblicuángulos.

NOTA: En los siguientes ejercicios señala las soluciones más aproximadas pues pueden existir ligeras variaciones según el número de decimales que hayas tomado en cada operación.

009

Resuelve el triángulo ABC, dados:  $a = 7$  cm,  $B = 60^\circ$ ,  $C = 45^\circ$   
Calcula A, b, c y el área del triángulo.

4E/1B



$$A + B + C = 180^\circ$$

$$A = 180^\circ - B - C = 180^\circ - 60^\circ - 45^\circ = 75^\circ$$

Aplicamos el TEOREMA DEL SENOS:

$$\frac{a}{\sin A} = \frac{b}{\sin B} \rightarrow b = \frac{a \cdot \sin B}{\sin A}$$

$$b = \frac{7 \cdot \sin 60}{\sin 75}$$

GAMA ES

$$\frac{7 \times \sin 60}{\sin 75}$$

$$\frac{7 \times \sin(60)}{\sin(75)}$$

$$\frac{-7\sqrt{6} + 21\sqrt{2}}{2}$$

$$b = 6.276028305 \rightarrow b = 6.28 \text{ cm}$$

Aplicamos el teorema del seno:

$$\frac{a}{\sin A} = \frac{c}{\sin C} \rightarrow c = \frac{a \cdot \sin C}{\sin A}$$

$$c = \frac{7 \cdot \sin 45}{\sin 75}$$

GAMA ES

$$\frac{7 \times \sin 45}{\sin 75}$$

$$\frac{7 \times \sin(45)}{\sin(75)}$$

$$-7 + 7\sqrt{3}$$

$$5.124355653 \rightarrow c = 5.12 \text{ cm}$$

$$\text{Área} = \frac{1}{2} \cdot a \cdot b \cdot \sin C$$

El área de un triángulo es igual al semiproducto de dos lados por el seno del ángulo que forman

$$\text{Área} = \frac{1}{2} \cdot 7 \cdot 6.28 \cdot \sin 45^\circ$$

$$0.5 \times 7 \times 6.28 \times \sin(45)$$

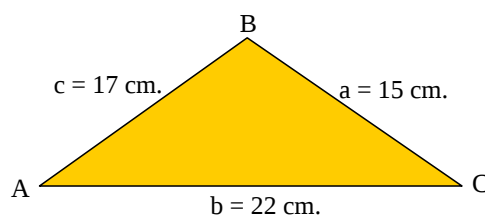
$$15.54220705$$

$$\text{Área} = 15.54 \text{ cm}^2$$

010

Resuelve el triángulo ABC, dados:  $a = 15$  cm,  $b = 22$ ,  $c = 17$  cm.  
Calcula A, B, C y el área del triángulo.

4E/1B



Aplicamos el TEOREMA DEL COSENO:

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



$$b^2 + c^2 - a^2 = 2 \cdot b \cdot c \cdot \cos A \rightarrow \cos A = \frac{b^2 + c^2 - a^2}{2 \cdot b \cdot c}$$

|                                                           |         |                                                                    |
|-----------------------------------------------------------|---------|--------------------------------------------------------------------|
| $\cos A = \frac{22^2 + 17^2 - 15^2}{2 \cdot 22 \cdot 17}$ | GAMA ES | $\frac{22^2 + 17^2 - 15^2}{2 \times 22 \times 17}$<br>0.7326203209 |
|-----------------------------------------------------------|---------|--------------------------------------------------------------------|

|                                                                                  |                            |                                         |
|----------------------------------------------------------------------------------|----------------------------|-----------------------------------------|
| Calculamos el ángulo cuyo coseno vale 0.7326203209<br>$A = \arccos 0.7326203209$ | GAMA ES<br>SHIFT COS Ans = | $\cos^{-1}(\text{Ans})$<br>42°53'36.54" |
|----------------------------------------------------------------------------------|----------------------------|-----------------------------------------|

$$A = 42^\circ 53' 36.54''$$

|                                                                                                       |         |                                                                     |
|-------------------------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------|
| $\cos B = \frac{a^2 + c^2 - b^2}{2 \cdot a \cdot c} = \frac{15^2 + 17^2 - 22^2}{2 \cdot 15 \cdot 17}$ | GAMA ES | $\frac{15^2 + 17^2 - 22^2}{2 \times 15 \times 17}$<br>0.05882352941 |
|-------------------------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------|

|                                                                                    |                            |                                         |
|------------------------------------------------------------------------------------|----------------------------|-----------------------------------------|
| Calculamos el ángulo cuyo coseno vale 0.05882352941<br>$B = \arccos 0.05882352941$ | GAMA ES<br>SHIFT COS Ans = | $\cos^{-1}(\text{Ans})$<br>86°37'39.77" |
|------------------------------------------------------------------------------------|----------------------------|-----------------------------------------|

$$B = 86^\circ 37' 39.77''$$

$$C = 180 - A - B = 50^\circ 28' 43.69''$$

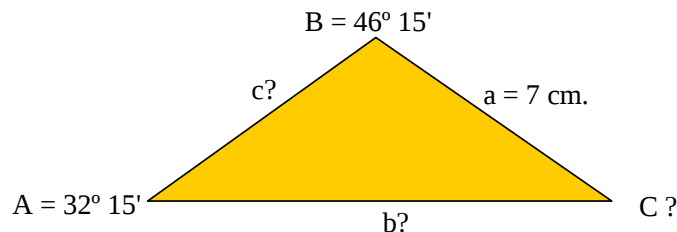
$$\text{Área} = \frac{1}{2} \cdot a \cdot b \cdot \sin C$$

El área de un triángulo es igual al semiproducto de dos lados por el seno del ángulo que forman

|                                                           |                                                                           |
|-----------------------------------------------------------|---------------------------------------------------------------------------|
| $\frac{1}{2} \cdot 15 \cdot 22 \sin 50^\circ 28' 43.69''$ | $0.5 \times 15 \times 22 \times \sin(50^\circ 28' 43.69'')$<br>127.279219 |
|-----------------------------------------------------------|---------------------------------------------------------------------------|

$$\text{Área} = 127.28 \text{ cm}^2$$

|     |                                                                                                                                                    |       |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 011 | Resuelve el triángulo ABC, dados: $a = 7 \text{ cm}$ , $A = 32^\circ 15'$ , $B = 46^\circ 15'$<br>Calcula $C$ , $b$ , $c$ y el área del triángulo. | 4E/18 |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------|-------|



$$A + B + C = 180^\circ$$

$$C = 180^\circ - 46^\circ 15' - 32^\circ 15' = 101^\circ 30'$$

Aplicamos el TEOREMA DEL SENOS:

$$\frac{a}{\sin A} = \frac{c}{\sin C} \rightarrow c = \frac{a \cdot \sin C}{\sin A}$$

|                                                            |                                         |                                                                          |
|------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------|
| $c = \frac{7 \cdot \sin 101^\circ 30'}{\sin 32^\circ 15'}$ | GAMA ES<br>7 X sin 101 30 / sin 32 15 = | $\frac{7 \times \sin(101^\circ 30')}{\sin(32^\circ 15')}$<br>12.85473451 |
|------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------|

$$c = 12.85 \text{ cm}$$

Aplicamos el teorema del seno:

$$\frac{a}{\sin A} = \frac{b}{\sin B} \rightarrow b = \frac{a \cdot \sin B}{\sin A}$$

|                                                                         |         |                                                                         |
|-------------------------------------------------------------------------|---------|-------------------------------------------------------------------------|
| $b = \frac{7 \cdot \text{sen } 46^\circ 15'}{\text{sen } 32^\circ 15'}$ | GAMA ES | $\frac{7 \times \sin(46^\circ 15')}{\sin(32^\circ 15')}$<br>9.476031074 |
|-------------------------------------------------------------------------|---------|-------------------------------------------------------------------------|

$$b = 9.48 \text{ cm}$$

**RESUMEN de SOLUCIONES: C = 101° 30' b = 9.48 cm. c = 12.85 cm.**

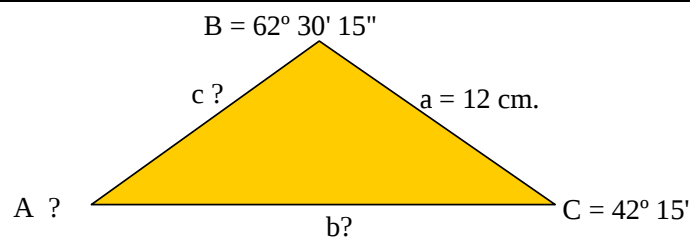
$$\text{Área} = \frac{1}{2} \cdot a \cdot b \cdot \text{sen } C$$

El área de un triángulo es igual al semiproducto de dos lados por el seno del ángulo que forman

|                                                             |                                                                     |
|-------------------------------------------------------------|---------------------------------------------------------------------|
| $\frac{1}{2} \cdot 7 \cdot 9.48 \text{ sen } 101^\circ 30'$ | $0.5 \times 7 \times 9.48 \times \sin(101^\circ 30')$<br>32.5139017 |
|-------------------------------------------------------------|---------------------------------------------------------------------|

$$\text{Área} = 32.51 \text{ cm}^2$$

|                                                                                       |                                                                                                                         |       |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------|
|  012 | Resuelve el triángulo ABC, dados: a = 12 cm, B = 62° 30' 15'', C = 42° 15'.<br>Calcula A, b, c y el área del triángulo. | 4E/1B |
|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------|



$$A + B + C = 180^\circ$$

$$A = 180^\circ - 62^\circ 30' 15'' - 42^\circ 15' = 75^\circ 14' 45''$$

|                                         |                            |                        |
|-----------------------------------------|----------------------------|------------------------|
| Introducimos este valor en la memoria A | GAMA ES<br>SHIFT RCL hyp = | Ans → A<br>75.24583333 |
|-----------------------------------------|----------------------------|------------------------|

Aplicamos el TEOREMA DEL SENOS:

$$\frac{a}{\text{sen } A} = \frac{c}{\text{sen } C} \rightarrow c = \frac{a \cdot \text{sen } C}{\text{sen } A}$$

|                                                                               |         |                                                                               |
|-------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------|
| $c = \frac{12 \cdot \text{sen } 42^\circ 15'}{\text{sen } 75^\circ 14' 45''}$ | GAMA ES | $\frac{12 \times \sin(42^\circ 15')}{\sin(75^\circ 14' 45'')}$<br>8.343508687 |
|-------------------------------------------------------------------------------|---------|-------------------------------------------------------------------------------|

$$c = 8.34 \text{ cm}$$

Aplicamos de nuevo el teorema del seno:

$$\frac{a}{\text{sen } A} = \frac{b}{\text{sen } B} \rightarrow b = \frac{a \cdot \text{sen } B}{\text{sen } A}$$

|                                                                                    |         |                                                                                    |
|------------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------|
| $b = \frac{12 \cdot \text{sen } 62^\circ 30' 15''}{\text{sen } 75^\circ 14' 45''}$ | GAMA ES | $\frac{12 \times \sin(62^\circ 30' 15'')}{\sin(75^\circ 14' 45'')}$<br>11.00747785 |
|------------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------|

$$b = 11.01 \text{ cm}$$

**RESUMEN de SOLUCIONES: A = 75° 14' 45'' b = 11.01 cm. c = 8.34 cm.**

$$\text{Área} = \frac{1}{2} \cdot a \cdot b \cdot \text{sen } C$$

El área de un triángulo es igual al semiproducto de dos lados por el seno del ángulo que forman

|                                                              |                                                                      |
|--------------------------------------------------------------|----------------------------------------------------------------------|
| $\frac{1}{2} \cdot 12 \cdot 11.01 \text{ sen } 42^\circ 15'$ | $0.5 \times 12 \times 11.01 \times \sin(42^\circ 15')$<br>44.4165513 |
|--------------------------------------------------------------|----------------------------------------------------------------------|

$$\text{Área} = 44.42 \text{ cm}^2$$