Exercices de math ECG J.P. – 2ème A

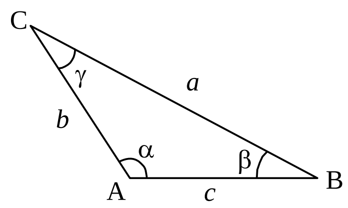
Trigonométrie du triangle quelconque

SERIE 20

Calculatrice autorisée

Le théorème du cosinus :

On considère un **triangle quelconque** ABC comme sur la figure ce-dessous.



On a alors les relations suivantes :

$$\boxed{a^2 = b^2 + c^2 - 2bc\cos(\alpha)}$$

$$b^2 = a^2 + c^2 - 2ac\cos(\beta)$$

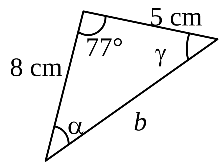
$$c^2 = a^2 + b^2 - 2ab\cos(\gamma)$$

Remarques :

- Si $\alpha = 90°$ on retrouve le théorème de Pythagore.
- Le théorème du cosinus permet de résoudre les cas où le théorème du sinus ne peut être utilisé directement. On déterminer l'élément manquant d'un triangle quelconque si l'on connaît l'une des combinaisons suivantes :
  1) deux côtés et l'angle entre eux (CAC)
  2) trois côtés (CCC)

Exemples :

a)



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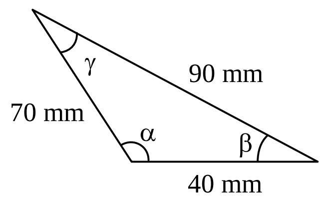
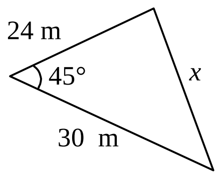


Exercice 1 :

Calculer l'inconnue dans les triangles suivants :

a)



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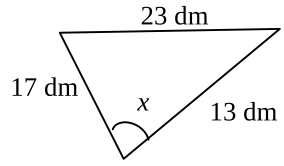

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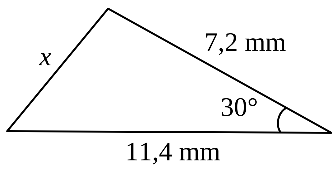
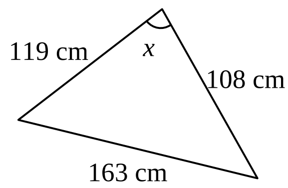


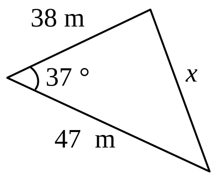
d)



Exercice 2 :

Trouver l'inconnue dans les triangles ci-dessous :

a)



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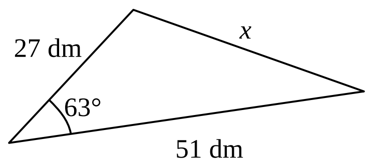

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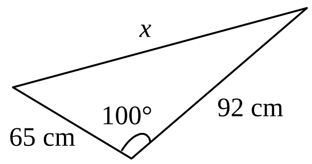
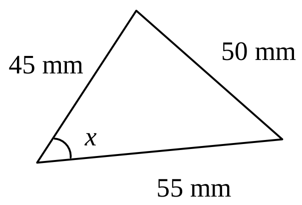
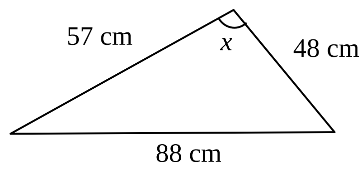


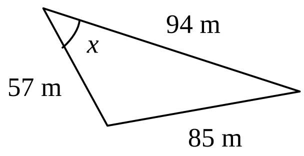
d)



e)



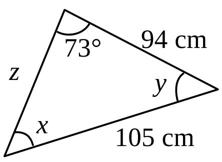
f)



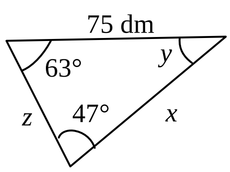
Exercice 3 :

Calculer les inconnues dans les triangles suivants :

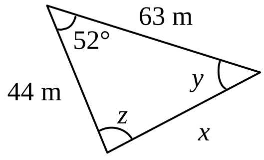
a)



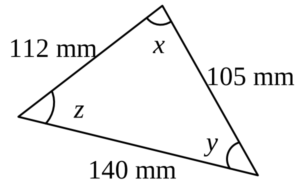
c)



b)



d)



Solutions :

Ex 1 : a) x = 21,40 m ; b) x = 6,30 mm ; c) x = 99,2° ; d) x = 91,7°

Ex 2 : a) 28,29 m ; b) 45,60 dm ; c) 121,51 cm ; d) 59° ; e) 113,6° ; f) 63°

Ex 3 : a) x = 58,9° ; y = 48,1° ; z = 81,72 cm c) x = 91,37 dm ; y = 70° ; z = 96,27 dm

b) x = 49,92 m ; y = 44° ; z = 84° d) x = 80,3° ; y = 52,1 ° ; z = 47,6°