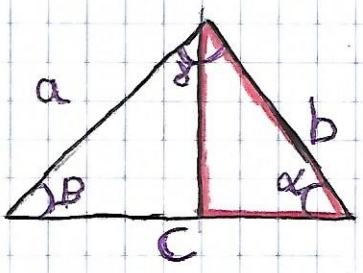
Exercices 2

ÉNONCÉ 1°) $a = 10cm ; b = 13cm ; C = 18cm$ (3 côtés)



$a = 10cm$, $\alpha = ?$ 32,88°

$b = 13cm$, $\beta = ?$ 44,9°

$C = 18cm$, $\gamma = ?$ 102,21°

1) $a^2 = b^2 + C^2 - 2.b.C.\cos\hat{\alpha}$

2) $b^2 = a^2 + C^2 - 2.a.C.\cos\hat{\beta}$

3) $C^2 = a^2 + b^2 - 2.a.b.\cos\hat{\gamma}$

$\hat{\alpha} = a^2 = b^2 + C^2 - 2.b.C.\cos\hat{\alpha}$

$10^2 = 13^2 + 18^2 - 2.b.C.\cos\hat{\alpha}$

$100 = 169 + 324 \quad -2.10.18.\cos\hat{\alpha}$

$100 - 169 - 324 \quad -2.10.18.\cos\hat{\alpha}$

$= -393 \quad = -468$

SHIFT $\cos\alpha = \frac{-393}{-468} = \boxed{32,88°}$ ou 32,9

$\hat{\beta} = b^2 = a^2 + C^2 - 2.a.C.\cos\hat{\beta}$

$\hat{\beta} = 13^2 = 10^2 + 18^2 - 2.10.18.\cos\hat{\beta}$

$= 169 = 100 + 324 - 2.10.18.\cos\hat{\beta}$

$169 - 100 - 324 \quad -2.10.18.\cos\hat{\beta}$

$-255 \quad -360$

SHIFT $\cos\hat{\beta} = \frac{-255}{-360} = \boxed{44,9°}$

$\hat{\gamma} = C^2 = a^2 + b^2 - 2.a.b.\cos\hat{\gamma}$

$18^2 = 10^2 + 13^2 - 2.a.b.\cos\hat{\gamma}$

$324 = 100 + 169 \quad -2.10.13.\cos\hat{\gamma}$

$324 - 100 - 169 \quad -2.10.13.\cos\hat{\gamma}$

$= 55 \quad = -260$

SHIFT $\cos\hat{\gamma} = \frac{55}{-260} = \boxed{102,21°}$

ou $\hat{\gamma} = 180 - 32,88 - 44,9$

$= 102,22$

Aire : $\frac{18 \times 7,057}{2} = 63,51\ cm^2$

... $\sin\hat{\alpha} = \frac{h}{b} \Rightarrow h = \sin\hat{\alpha}.b$

Hauteur

$\sin 32,88.13$

$0,542881334 2.13 = \boxed{7,057457345}$

ÉNONCÉ 2°) $a = 12\,cm$; $b = 15\,cm$; $\gamma = 75°$ (cosinus)

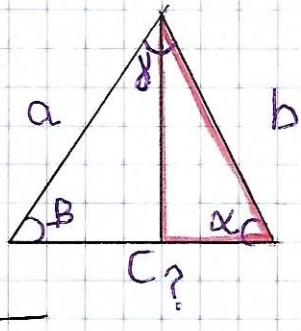
$a = 12\,cm$, $\hat{\gamma} = 75°$

$b = 15\,cm$, $\hat{\alpha} = ?$ 44,23°

$C = ?$ 16,60cm, $\hat{\beta} = ?$ 60,72°

Aire = ? 85,905 cm²

hauteur ? 10,35



$C^2 = a^2 + b^2 - 2 \cdot a \cdot b \cdot \cos\gamma$

$12^2 + 15^2 - 2 \cdot 12 \cdot 15 \cdot \cos 75° = \sqrt{275,8251438} = \boxed{16,60798434}$

$\hat{\beta} = B^2 = a^2 + C^2 - 2 \cdot a \cdot C \cdot \cos\beta$

$225 = 144 + 275,82 - 2 \cdot 12 \cdot 16,60 \cdot \cos\beta$

$225 - 144 - 275,82 = -2 \cdot 12 \cdot 16,60 \cdot \cos\beta$

$-194,82 = -398,4$

SHIFT $\cos\beta = \frac{-194,82}{-398,4} = 0,4889 \xrightarrow{\cos^{-1}} \boxed{60,72472866}$

$\hat{\alpha} = a^2 = b^2 + C^2 - 2 \cdot b \cdot C \cdot \cos\hat{\alpha}$

$144 = 225 + 275,82 - 2 \cdot 15 \cdot 16,60$

$-356,8 = -498$

SHIFT $\cos\hat{\alpha} = \frac{-356,8}{-498} = \boxed{\hat{\alpha} = 44,23°}$

Hauteur $\sin\hat{\alpha} = \frac{h}{b} \rightarrow h = \sin\hat{\alpha} \cdot b$

$\sin 44,23 \cdot 15$

$0,69 \cdot 15 = \boxed{10,35}$

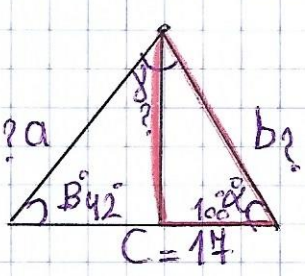
Aire $\rightarrow \frac{b \cdot h}{2} = \frac{16,60 \cdot 10,35}{2} = \frac{171,81}{2} = \boxed{85,905\,cm^2}$

ÉNONCÉ 3°) $\alpha = 100°$; $B = 42°$; $C = 17\,cm$ (Sinus)

$a = ?$ 27,19cm $\hat{\alpha}$ 100°

$b = ?$ 18,47cm $\hat{B}$ 42°

$C = 17\,cm$, $\hat{\gamma}$? 38°



$\hat{\gamma} = 180° - 100° - 42° = \boxed{38°}$

$\frac{C}{\sin\gamma} = \frac{b}{\sin B} = \frac{a}{\sin\alpha}$

$\frac{17}{\sin 38°} = \frac{b}{\sin 42°} = \frac{a}{\sin 100°}$

$27,61 = \frac{b}{\sin 42} = b = 27,61 \cdot \sin 42° = \boxed{18,47\,cm}$

$$27,61 = \frac{a}{\sin 100} \rightarrow a = 27,61 \cdot \sin 100° = \boxed{27,19 \text{ cm}}$$

Hauteur $\sin \hat{\alpha} = \frac{h}{b} = h = \sin \alpha \cdot b$

$\sin 100° \cdot 18,47 \text{ cm}$

0,984807753 $\cdot 18,47 = 18,189$

Aire $\frac{17 \cdot 18,189}{2} = 154,60 \text{ cm}^2$

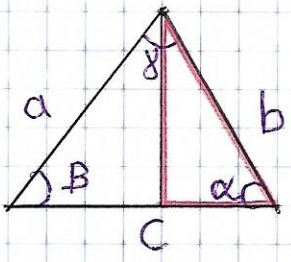
Suite de la Solution de l'exercice 3

ÉNONCÉ 4°) $a = 14\,cm$; $b = 18\,cm$; $\alpha = 40°$ (Sinus)

$a = 14cm$, $\hat{\alpha} = 40$

$b = 18cm$, $\hat{B} = ?\ 55,73°$

$C = ?\ 21,67cm$, $\hat{\gamma} = ?\ 84,27°$



$$\frac{a}{\sin\hat{\alpha}} = \frac{b}{\sin\hat{B}} = \frac{c}{\sin\hat{\gamma}}$$

$$\frac{14}{\sin 40°} = \frac{18}{\sin\hat{B}}$$

$$21,78 = \frac{18}{\sin\hat{B}} \longrightarrow \sin\hat{B} = 21,78 \cdot \sin\hat{B} = \frac{18}{\sin\hat{B}} \cdot \sin\hat{B}$$

SHIFT $\sin\hat{B} = \frac{18}{21,78} = \boxed{55,735394\,11}$ (SHIFT SIN $\hat{B}$, ou $SIN^{-1}\hat{B}$)

$\hat{\gamma} = 180 - 40 - 55,73 = \boxed{84,27°}$

$$C = \frac{18}{55,73} = \frac{C}{\sin 84,27}$$

$$21,78 = \frac{C}{\sin 84,27} = C = 21,78 \cdot \sin 84,27$$

$$= \boxed{21,671174\,7}$$

Hauteur $\sin\hat{\alpha} = \frac{h}{b} = h = \sin\hat{\alpha} \cdot b$

$\sin 40 \cdot 18$

$0,642787609\,7 \cdot 18 = \boxed{11,570176\,94}$

Aire $\frac{b \cdot h}{2} = \frac{21,67 \cdot 11,54}{2} = \boxed{125,3696632}$

ÉNONCÉ 5°) $a = 5\,cm$; $b = 7\,cm$; $C = 13\,cm$

Règle des cosinus :

$$\underbrace{(13)^2}_{169} = \underbrace{(5)^2}_{25} + \underbrace{(7)^2}_{49} + \underbrace{2 \cdot 5 \cdot 7}_{70} \cdot \cos\gamma$$

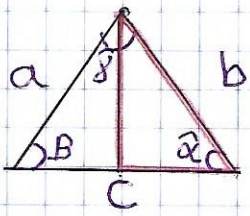
$169 - 25 - 49 = 70 \cdot \cos\gamma$ → PAS possible car $\cos\gamma$ doit être entre

ENONCÉ 6°) $a = 5\,cm$; $b = 4\,cm$; $\hat{\alpha} = 25°$ (Sinus)

$a = 5\,cm$, $\hat{\alpha} = 25°$

$b = 4\,cm$, $\hat{B} = ?$ 19,76°

$C = ?$ 8,33cm , $\hat{\gamma} = ?$ 135,24°



$$\frac{a}{\sin\hat{\alpha}} = \frac{b}{\sin\hat{B}} = \frac{c}{\sin\hat{\gamma}}$$

$$\frac{5}{\sin 25} = \frac{4}{\sin\hat{B}} \rightarrow \sin B = 11{,}83 \cdot \sin B = \frac{4}{\sin B} \cdot \sin B$$

$\frac{5}{\sin 25}$ = 11,831100792

$$\sin B = \frac{4}{11{,}83} = 19{,}76082982$$

$$\frac{b}{\sin B} = \frac{c}{\sin\hat{\gamma}}$$

$$\hat{\gamma} = 180 - 25° - 19{,}76° = 135{,}24°$$

$\frac{4}{19{,}76} = \frac{c}{\sin\hat{\gamma}} = 135{,}24°$

$$11{,}8314849 = \frac{c}{\sin 135{,}24°} = C = 11{,}8314849 \cdot \sin 135{,}24$$

$C = 8{,}33\,cm$

Hauteur $\sin\hat{\alpha} = \frac{h}{b} = h = \sin\hat{\alpha} \cdot b$

$0{,}42261826^{25} \cdot 4^{4} = 1{,}690473047$

Aire $\frac{8{,}33 \cdot 1{,}690473047}{2} = 7{,}040820241\,cm^2$