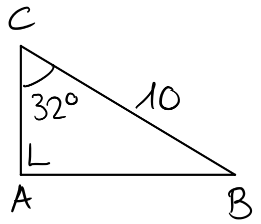
Ex 4.2.1

a)

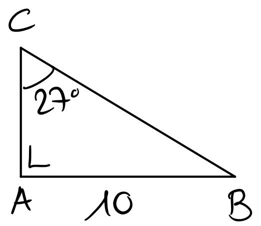


* $\beta = 90 - 32 = 58°$
* $\sin(32°) = \dfrac{AB}{10} \iff AB = 10 \cdot \sin(32°) \cong 5{,}3\,u$
* Pythagore : $AC \cong \sqrt{10^2 - 5{,}3^2} \cong 8{,}48\,u$

ou $\cos(32°) = \dfrac{AC}{10} \iff AC = 10 \cdot \cos(32°) \cong 8{,}48\,u$

* Aire $= \dfrac{AB \cdot AC}{2} \cong 22{,}47\ u^2$

c)

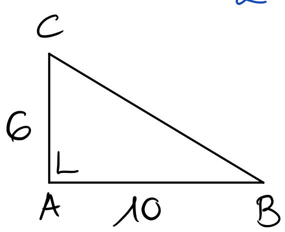


* $\beta = 90 - 27 = 63°$
* $\tan(27°) = \dfrac{10}{AC} \iff AC = \dfrac{10}{\tan(27°)} \cong 19{,}63\ u$
* Pythagore : $BC \cong \sqrt{10^2 + 19{,}63^2} \cong 22{,}03\,u$

ou $\sin(27°) = \dfrac{10}{BC} \iff BC = \dfrac{10}{\sin(27°)} \cong 22{,}03\,u$

* Aire $\cong \dfrac{10 \cdot 19{,}63}{2} \cong 98{,}13\ u^2$

d)

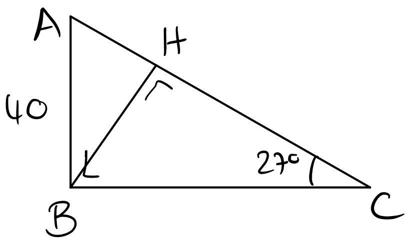


* Pythagore : $BC = \sqrt{10^2 + 6^2} \cong 11{,}66\ u$
* $\tan(\beta) = \dfrac{6}{10} = \dfrac{3}{5} \iff \beta = \tan^{-1}\left(\dfrac{3}{5}\right) \cong 30{,}96°$
* $\gamma \cong 90 - 30{,}96 \cong 59{,}04°$

ou $\tan(\gamma) = \dfrac{10}{6} = \dfrac{5}{3} \iff \gamma = \tan^{-1}\left(\dfrac{5}{3}\right) \cong 59{,}04°$

* Aire $= \dfrac{6 \cdot 10}{2} = 30\,u^2$

Ex 4.2.2

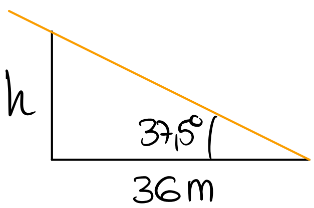


* $\tan(27°) = \dfrac{40}{BC} \iff BC = \dfrac{40}{\tan(27°)} \cong 78{,}5\ cm$
* $\cos(27°) \cong \dfrac{CH}{78{,}5} \iff CH \cong 78{,}5 \cdot \cos(27°) \cong 69{,}95\,cm$

$* \quad \sin(27°) = \dfrac{40}{AC} \iff AC = \dfrac{40}{\sin(27°)} \cong \underline{88{,}11 \text{ cm}}$

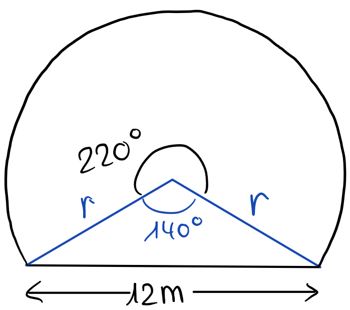
$\Rightarrow \quad AH \cong 88{,}11 - 69{,}95 \cong \underline{18{,}16 \text{ cm}}$

Ex 4.2.3



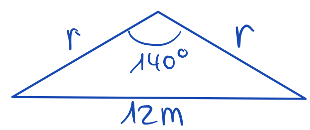
$\tan(37{,}5) = \dfrac{h}{36} \iff h = 36 \cdot \tan(37{,}5) \cong \underline{27{,}62 \text{ m}}$

Ex 4.2.5

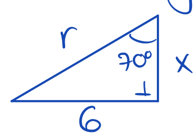


$* \quad 360 - 220 = 140°$

On travaille avec le triangle isocèle



ou plutôt la moitié de ce triangle, qui est rectangle.



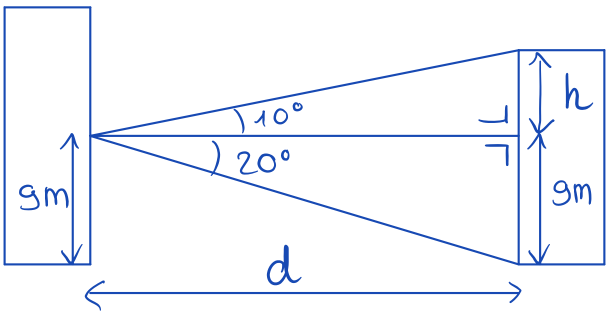
$* \quad \sin(70) = \dfrac{6}{r} \iff r = \dfrac{6}{\sin(70)} \cong \underline{6{,}39 \text{ m}}.$

$* \quad \tan(70) = \dfrac{6}{x} \iff x = \dfrac{6}{\tan(70)} \cong 2{,}18 \text{ m}.$

$\Rightarrow$ la hauteur maximum de la voûte au-dessus du sol est égale

à $6{,}39 + 2{,}18 \cong \underline{8{,}57 \text{ m}}$

Ex 4.2.8

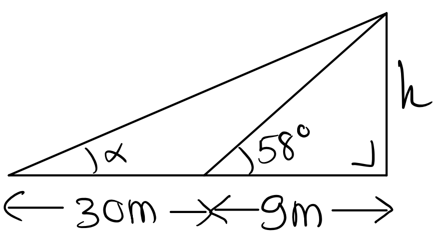


$\tan(20°) = \dfrac{9}{d} \Leftrightarrow d = \dfrac{9}{\tan(20°)} \cong 24{,}73$ m

$\Rightarrow \tan(10°) = \dfrac{h}{d} \Leftrightarrow h = d \cdot \tan(10°) \cong 4{,}36$ m

La hauteur du bâtiment est de $9 + 4{,}36 \cong 13{,}36$ m.

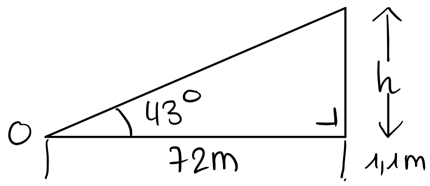
Ex 4.2.9



* $\tan(58°) = \dfrac{h}{9} \Leftrightarrow h = 9 \cdot \tan(58°) \cong 14{,}4$m

* $\tan(\alpha) \cong \dfrac{14{,}4}{39} \Leftrightarrow \alpha = \tan^{-1}\left(\dfrac{14{,}4}{39}\right) \cong 20{,}27°$

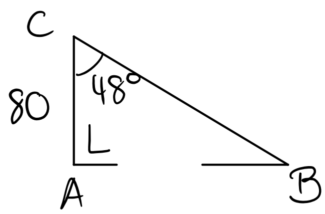
Ex 4.2.17



$\tan(43°) = \dfrac{h}{72} \Leftrightarrow h = 72 \cdot \tan(43°) \simeq 67{,}14$

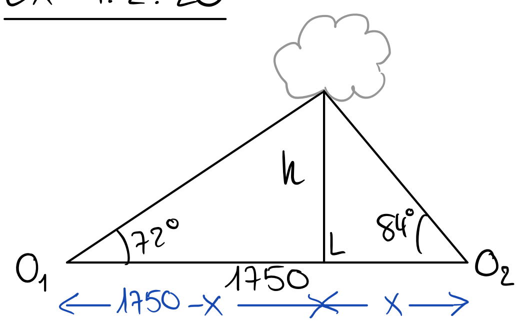
$\Rightarrow$ la tour mesure environ $67{,}14 + 1{,}1 \simeq \underline{68{,}24 \text{ m}}$.

Ex 4.2.19



$\tan(48°) = \dfrac{AB}{80} \Leftrightarrow AB = 80 \cdot \tan(48°) \simeq \underline{88{,}85 \text{ m}}$

Ex 4.2.20



$$\begin{cases} \tan(72°) = \dfrac{h}{1750 - x} \Leftrightarrow h = (1750 - x) \cdot \tan(72°) & (1) \\ \tan(84°) = \dfrac{h}{x} \Leftrightarrow h = x \cdot \tan(84°) & (2) \end{cases}$$

Par comparaison :

(1) et (2)

$\Rightarrow (1750 - x) \cdot \tan(72°) = x \cdot \tan(84°)$

$\Leftrightarrow 1750 \cdot \tan(72°) - x \tan(72°) = x \cdot \tan(84°)$

$\Leftrightarrow 1750 \cdot \tan(72°) = x \cdot \tan(84) + x \tan(72)$

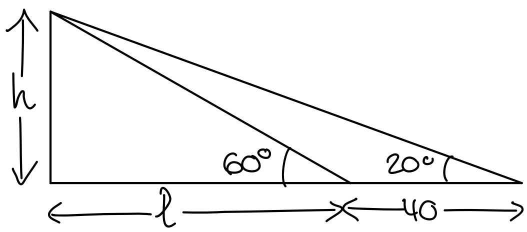
$\Leftrightarrow 1750 \cdot \tan(72°) = x \left(\tan(84°) + \tan(72°) \right)$

$\Leftrightarrow \dfrac{1750 \cdot \tan(72°)}{\tan(84°) + \tan(72°)} = x \simeq 427{,}73 \text{ m}$

(2)

$\Rightarrow h \simeq 427{,}73 \cdot \tan(84°) \simeq \underline{4069{,}54 \text{ m}}$

Ex 4.2.21



$$\begin{cases} \tan(60°) = \dfrac{h}{\ell} & \Leftrightarrow \quad h = \ell \cdot \tan(60°) \quad (1) \\ \tan(20°) = \dfrac{h}{\ell+40} & \Leftrightarrow \quad h = (\ell+40)\tan(20°) \quad (2) \end{cases}$$

par comparaion :

(1) et (2)

$$\Rightarrow \quad \ell \cdot \tan(60°) = (\ell+40)\tan(20°)$$

$$\Leftrightarrow \quad \ell \cdot \tan(60) = \ell \cdot \tan(20) + 40\tan(20)$$

$$\Leftrightarrow \quad \ell \tan(60) - \ell \tan(20) = 40\tan(20)$$

$$\Leftrightarrow \quad \ell \cdot (\tan(60) - \tan(20)) = 40\tan(20)$$

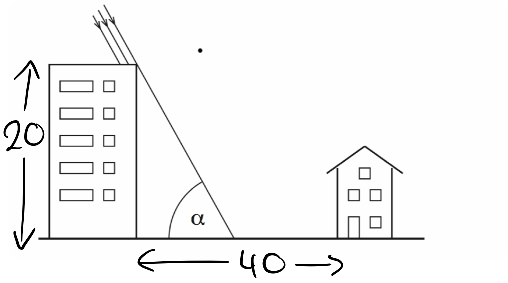
$$\Leftrightarrow \quad \ell = \frac{40\tan(20)}{\tan(60) - \tan(20)} \cong 10{,}64 \text{ m}$$

(1)

$$\Rightarrow \quad h \cong 10{,}64 \cdot \tan(60) = 18{,}43 \text{ m}$$

L'arbre mesure environ 18,4 m et la rivière 10,6 m de large.

Ex 4.2.22

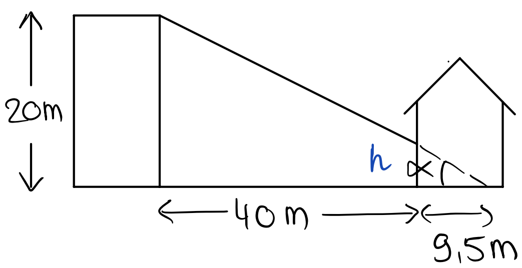


a) $\alpha = 72°$

$\tan(72°) = \frac{20}{x} \Leftrightarrow x = \frac{20}{\tan(72°)} \simeq 6{,}5m < 40m$ ✓

b) $\alpha = 22°$

$\tan(22°) = \frac{20}{x} \Leftrightarrow x = \frac{20}{\tan(22°)} \simeq 49{,}5\,m > 40m$



$\tan(22°) \simeq \frac{h}{9{,}5} \Leftrightarrow h \simeq 9{,}5 \cdot \tan(22°) \simeq 3{,}84\,m$