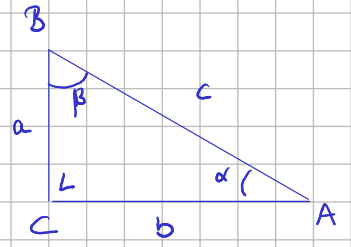


Trigonométrie - Révisions - solutions détaillées

Exercice 1



a) $\gamma = 90^\circ$, $a = 3,2 \text{ cm}$, $b = 6,5 \text{ cm}$

$$\tan \alpha = \frac{a}{b} \Rightarrow \tan \alpha = \frac{3,2}{6,5} \Rightarrow \alpha = \tan^{-1}\left(\frac{3,2}{6,5}\right) = 26,21^\circ$$

$$\beta = 90 - 26,2 = 63,79^\circ$$

$$c = \sqrt{3,2^2 + 6,5^2} = \sqrt{52,49} = 7,24 \text{ cm}$$

b) $\gamma = 90^\circ$, $\alpha = 63,5^\circ$, $c = 10 \text{ cm}$

$$\beta = 90 - 63,5 = 26,5^\circ$$

$$\sin \alpha = \frac{a}{c} \Rightarrow \sin(63,5^\circ) = \frac{a}{10} \Rightarrow a = 10 \cdot \sin(63,5^\circ) = 8,95 \text{ cm}$$

$$\cos \alpha = \frac{b}{c} \Rightarrow \cos(63,5^\circ) = \frac{b}{10} \Rightarrow b = 10 \cdot \cos(63,5^\circ) = 4,46 \text{ cm}$$

c) $\gamma = 90^\circ$, $b = 4,4 \text{ cm}$, $\beta = 40^\circ$

$$\alpha = 90 - 40 = 50^\circ$$

$$\sin \beta = \frac{b}{c} \Rightarrow \sin(40^\circ) = \frac{4,4}{c} \Rightarrow c = \frac{4,4}{\sin(40^\circ)} = 6,85 \text{ cm}$$

$$\tan \beta = \frac{b}{a} \Rightarrow \tan(40^\circ) = \frac{4,4}{a} \Rightarrow a = \frac{4,4}{\tan(40^\circ)} = 5,24 \text{ cm}$$

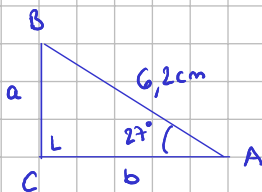
d) $\gamma = 90^\circ$, $a = 15,7 \text{ cm}$, $\beta = 12,3^\circ$

$$\alpha = 90 - 12,3 = 77,7^\circ$$

$$\cos \beta = \frac{a}{c} \Rightarrow \cos(12,3^\circ) = \frac{15,7}{c} \Rightarrow c = \frac{15,7}{\cos(12,3^\circ)} = 16,07 \text{ cm}$$

$$\tan \beta = \frac{b}{a} \Rightarrow \tan(12,3^\circ) = \frac{b}{15,7} \Rightarrow b = 15,7 \cdot \tan(12,3^\circ) = 3,42 \text{ cm}$$

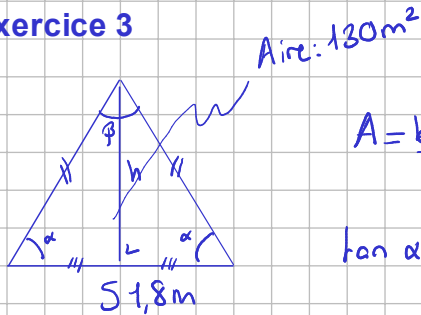
Exercice 2



$$\sin(27^\circ) = \frac{a}{6,2} \Rightarrow a = 6,2 \cdot \sin(27^\circ) = 2,81 \text{ cm}$$

$$\cos(27^\circ) = \frac{b}{6,2} \Rightarrow b = 6,2 \cdot \cos(27^\circ) = 5,52 \text{ cm}$$

Exercise 3



$$A = \frac{b \cdot h}{2} \Rightarrow h = \frac{2 \cdot A}{b} = \frac{2 \cdot 130}{51,8} = 5,02 \text{ m}$$

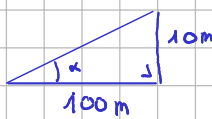
$$\tan \alpha = \frac{h}{\frac{b}{2}} \Rightarrow \tan \alpha = \frac{2h}{b} \Rightarrow \alpha = \tan^{-1} \left(\frac{2 \cdot 5,02}{51,8} \right)$$

$$\alpha = \tan^{-1}(0,194) = 10,97^\circ \approx 11^\circ$$

$$\beta = 180 - 2 \cdot 10,97 = 158,06 = 158^\circ$$

Exercise 4

a)



$$\tan \alpha = \frac{10}{100} \Rightarrow \alpha = \tan^{-1} \left(\frac{10}{100} \right) = \tan^{-1} \left(\frac{1}{10} \right) = 5,71^\circ$$

b) $\alpha = \tan^{-1} \left(\frac{20}{100} \right) = 11,31^\circ$ c) $\alpha = \tan^{-1} \left(\frac{50}{100} \right) = 26,57^\circ$ d) $\alpha = \tan^{-1} \left(\frac{100}{100} \right) = 45^\circ$

Exercise 5

a)



$$\tan(10^\circ) = \frac{x}{100} \Rightarrow x = 100 \cdot \tan(10^\circ) = 17,63 \text{ m}$$

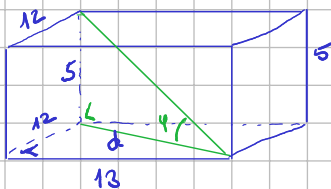
$$\Rightarrow \text{la pente vaut } 17,6\%$$

b) $x = 100 \cdot \tan(20^\circ) = 36,4 \text{ m} \Rightarrow \text{la pente vaut } 36,4\%$

c) $x = 100 \cdot \tan(60^\circ) = 173,21 \text{ m} \Rightarrow \text{la pente vaut } 173,2\%$

d) $x = 100 \cdot \tan(85^\circ) = 1143,01 \text{ m} \Rightarrow \text{la pente vaut } 1143\%$

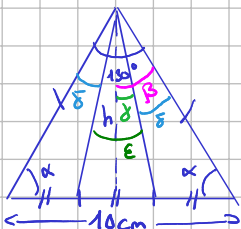
Exercise 6



$$\text{Par Pythagore: } d = \sqrt{12^2 + 13^2} = \sqrt{313} = 17,69$$

$$\tan \varphi = \frac{5}{d} \Rightarrow \varphi = \tan^{-1} \left(\frac{5}{\sqrt{313}} \right) = 15,78^\circ$$

Exercise 7



$$\alpha = \frac{180 - 130}{2} = 25^\circ \quad \beta = \frac{130}{2} = 65^\circ$$

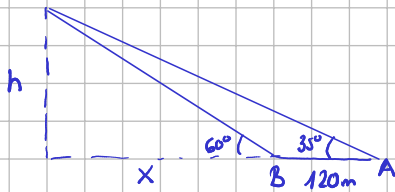
$$\tan \alpha = \frac{h}{\frac{10}{2}} \Rightarrow \tan(25^\circ) = \frac{h}{5} \Rightarrow h = 5 \cdot \tan(25^\circ) = 2,33$$

$$\tan \delta = \frac{\frac{10}{2}}{h} \Rightarrow \tan \delta = \frac{5}{2,33} \Rightarrow \delta = \tan^{-1} \left(\frac{5}{2,33} \right) = 35,56^\circ$$

$$\delta = \beta - \alpha = 65 - 35,56 = 29,44^\circ$$

$$\epsilon = 2 \cdot \delta = 2 \cdot 35,56 = 71,12^\circ$$

Exercise 8



$$\tan(60^\circ) = \frac{h}{x} \Rightarrow h = x \cdot \tan(60^\circ) = \sqrt{3} \cdot x$$

$$\tan(35^\circ) = \frac{h}{x+120} \Rightarrow h = (x+120) \cdot \tan(35^\circ)$$

$$\Rightarrow \sqrt{3}x = (x+120) \cdot \tan(35^\circ)$$

$$\sqrt{3}x = \tan(35^\circ) \cdot x + 120 \cdot \tan(35^\circ)$$

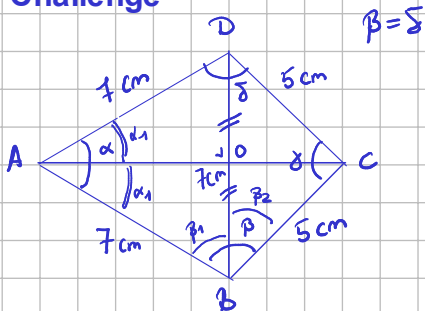
$$\sqrt{3}x - \tan(35^\circ)x = 120 \cdot \tan(35^\circ)$$

$$(\sqrt{3} - \tan(35^\circ))x = 120 \cdot \tan(35^\circ)$$

$$x = \frac{120 \cdot \tan(35^\circ)}{\sqrt{3} - \tan(35^\circ)} = 81,43\text{ m}$$

$$h = \sqrt{3} \cdot x = \sqrt{3} \cdot 81,43 = 141,04 \approx 141\text{ m}$$

Challenge



$$\sin \alpha_1 = \frac{\frac{7}{2}}{7} \Rightarrow \sin \alpha_1 = \frac{3,5}{7} \Rightarrow \alpha_1 = \sin^{-1}\left(\frac{1}{2}\right) = 30^\circ$$

$$\alpha = 2 \cdot 30 = 60^\circ$$

$$\cos \beta_2 = \frac{\frac{7}{2}}{5} \Rightarrow \cos \beta_2 = \frac{3,5}{5} \Rightarrow \beta_2 = \cos^{-1}\left(\frac{1}{2}\right) = 45,57^\circ$$

$$\beta_1 = 90 - 30 = 60^\circ$$

$$\delta = \beta = \beta_1 + \beta_2 = 60 + 45,57 = 105,57^\circ$$

$$\gamma = 360 - 60 - 2 \cdot 105,57 = 88,85^\circ$$