

LPDR - Niveau 1: TE 5 - Ingo

Exercice 1.

Partie 1

α°	30°	-60°	90°	120°	210°	-150°	270°
$\alpha \text{ (rad)}$	$\frac{\pi}{6}$	$-\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{7\pi}{6}$	$-\frac{5\pi}{6}$	$\frac{3\pi}{2}$
$\cos \alpha$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{2}$	0
$\sin \alpha$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	-1

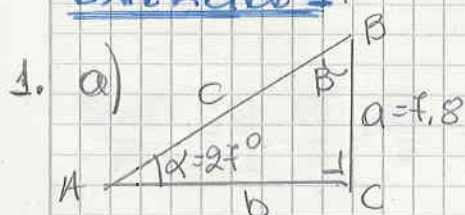
Exercice 2

a) $\sin(0) = 0$ b) $\cos(\frac{\pi}{2}) = 0$ c) $\tan(\frac{\pi}{4}) = \frac{\sqrt{2}}{2}$

d) $\cos(-\frac{\pi}{3}) = \cos \frac{\pi}{3} = \frac{1}{2}$ e) $\tan(2\pi) = 0$ f) $\sin(-\frac{\pi}{2}) = -1$

Partie 2

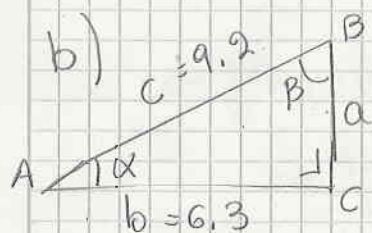
Exercice 1.



$$\beta = 90 - 27 = 63^\circ$$

$$\tan 27 = \frac{7.8}{b} \Rightarrow b = \frac{7.8}{\tan 27} \Rightarrow b = 15.3$$

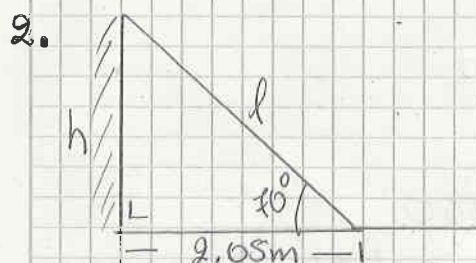
$$c = \sqrt{7.8^2 + 15.3^2} \Rightarrow c = 17.17$$



$$a = \sqrt{9.2^2 - 6.3^2} = 6.7$$

$$\cos \alpha = \frac{6.3}{9.2} = 0.685 \Rightarrow \alpha = 46.78^\circ$$

$$\beta = 90 - 46.78 \Rightarrow \beta = 43.22^\circ$$



$$\tan 70 = \frac{h}{2.05} \Rightarrow h = \tan 70 \cdot 2.05 \Rightarrow$$

$$h = 5.63 \text{ m}$$

$$\cos 70 = \frac{2.05}{l} \Rightarrow l = \frac{2.05}{\cos 70} \Rightarrow l \approx 6 \text{ m}$$

c) $h = 4 \text{ m}$ $l = 6 \text{ m}$ $\sin \alpha = \frac{4}{6} \Rightarrow \alpha = 41.81^\circ$

EXERCISE 2

$$1) a) 6180 = 17 \cdot 360 + 60 \Rightarrow d.g = 60^\circ$$

$$b) \frac{41\pi}{6} = \frac{36\pi}{6} + \frac{5\pi}{6} = 13 \cdot 2\pi + \frac{5\pi}{6} \Rightarrow d.g = \frac{5\pi}{6}$$

$$2) a) \cos \alpha = \frac{24}{25} \quad \alpha \in \mathbb{Q}_\Pi$$

$$\sin^2 \alpha + \cos^2 \alpha = 1 \Rightarrow \sin^2 \alpha + \frac{576}{625} = 1 \Rightarrow \sin^2 \alpha = \frac{49}{625} \Rightarrow$$

$$\Rightarrow \sin \alpha = \pm \frac{7}{25} \quad \alpha \in \mathbb{Q}_\Pi \Rightarrow \sin \alpha = \frac{7}{25}$$

$$b) \tan \alpha = -3 = \frac{\sin \alpha}{\cos \alpha} \Rightarrow \sin \alpha = -3 \cos \alpha$$

$$\sin^2 \alpha + \cos^2 \alpha = 1 \Rightarrow 9 \cos^2 \alpha + \cos^2 \alpha = 1 \Rightarrow$$

$$\Rightarrow 10 \cos^2 \alpha = 1 \Rightarrow \cos^2 \alpha = \frac{1}{10} \Rightarrow \cos \alpha = \pm \frac{1}{\sqrt{10}}$$

$$\alpha \in \mathbb{Q}_{IV} \Rightarrow \cos \alpha = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10} \quad \sin = -\frac{3\sqrt{10}}{10}$$

EXERCISE 3

$$a) \sin(105^\circ) = \sin(60 + 45) = \sin 60 \cos 45 + \sin 45 \cos 60 \\ = \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2} = \frac{\sqrt{6} + \sqrt{2}}{4}$$

$$b) \cos(-15^\circ) = \cos 15 = \cos(60 - 45) = \\ = \cos 60 \cos 45 + \sin 60 \sin 45 = \frac{1}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} = \frac{\sqrt{2} + \sqrt{6}}{4}$$

$$c) \sin\left(\frac{\pi}{8}\right)$$

$$\cos \frac{\pi}{4} = \cos\left(\frac{2\pi}{8}\right) = 1 - 2 \sin^2 \frac{\pi}{8} \Rightarrow \cos\left(\frac{\pi}{4}\right) = 1 - 2 \sin^2 \frac{\pi}{8} \Leftrightarrow$$

$$\Leftrightarrow 2 \sin^2 \frac{\pi}{8} = 1 - \cos \frac{\pi}{4} \Leftrightarrow 2 \sin^2 \frac{\pi}{8} = 1 - \frac{\sqrt{2}}{2} = \frac{2 - \sqrt{2}}{2} \Leftrightarrow$$

$$\sin^2 \frac{\pi}{8} = \frac{2 - \sqrt{2}}{4} \Rightarrow \sin \frac{\pi}{8} = \frac{\sqrt{2 - \sqrt{2}}}{2}$$

EXERCISE 4

$$a) \cos x = \frac{1}{2} \Rightarrow \begin{cases} x = \frac{\pi}{3} + 2k\pi \\ x = -\frac{\pi}{3} + 2k\pi \end{cases}$$

$$b) \sin x = 0.68 \Rightarrow \begin{cases} x = 42.84 + k360 \\ x = 180 - 42.84 + k360 = 137.16 + k360 \end{cases}$$

$$c) \tan x = -1 \Rightarrow x = -\frac{\pi}{4} + k\pi$$