

Question 1

(1) a) $\frac{93\pi}{7} \equiv 13\pi + \frac{2\pi}{7} \equiv -\pi + \frac{2\pi}{7} \equiv -\frac{5\pi}{7}$ rad (mes. princ.)

Toutes les mesures sont de la forme : $-\frac{5\pi}{7} + k \cdot 2\pi$, $k \in \mathbb{Z}$.

b) $-4145^\circ \equiv -11 \cdot 360^\circ - 185^\circ \equiv 360^\circ - 185^\circ \equiv 175^\circ$ (mes. princ.)

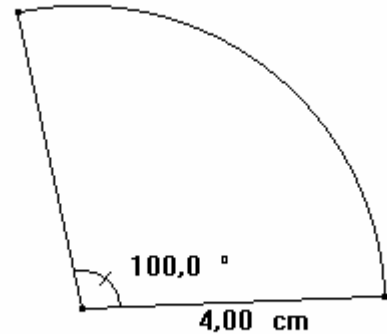
Toutes les mesures sont de la forme : $175^\circ + k \cdot 360^\circ$, $k \in \mathbb{Z}$.

(2) Mesure en radians de l'angle au centre :

$$100^\circ = \frac{\pi \cdot 100}{180} \text{ rad} = \frac{5\pi}{9} \text{ rad}$$

Longueur de l'arc de cercle :

$$l = \alpha \cdot r = \frac{5\pi \cdot 4}{9} = \frac{20\pi}{9} \simeq 6,98 \text{ cm}$$



Question 2

$$\begin{aligned} (1) \quad & \sin(3\pi - \alpha) - \cos\left(\frac{7\pi}{2} - \alpha\right) - \cos\left(\frac{22\pi}{3}\right) \\ &= \sin(\pi - \alpha) - \cos\left(-\frac{\pi}{2} - \alpha\right) - \cos\left(7\pi + \frac{\pi}{3}\right) \\ &= -\sin(-\alpha) - \cos\left(\frac{\pi}{2} + \alpha\right) - \cos\left(\pi + \frac{\pi}{3}\right) \\ &= \sin \alpha - \cos\left(\frac{\pi}{2} - (-\alpha)\right) + \cos\left(\frac{\pi}{3}\right) \\ &= \sin \alpha - \sin(-\alpha) + \frac{1}{2} \\ &= 2 \sin \alpha + \frac{1}{2} \end{aligned}$$

$$\begin{aligned} (2) \quad & \tan(\pi - \alpha) \cot\left(-\frac{3\pi}{2} - \alpha\right) \cos^2(-\alpha + 5\pi) \\ &= \tan(-\alpha) \cot\left(\frac{\pi}{2} - \alpha\right) \cos^2(-\alpha + \pi) \\ &= -\tan \alpha \cdot \tan \alpha \cdot \cos^2(-\alpha) \\ &= -\frac{\sin^2 \alpha}{\cos^2 \alpha} \cdot \cancel{\cos^2 \alpha} \\ &= -\sin^2 \alpha \end{aligned}$$

$$\begin{aligned} (3) \quad & \frac{\sin\left(\alpha - \frac{25\pi}{2}\right)}{\cos\left(\alpha + \frac{51\pi}{2}\right)} = \frac{\sin\left(\alpha - \frac{\pi}{2}\right)}{\cos\left(\alpha + \frac{3\pi}{2}\right)} \\ &= \frac{\sin\left(\alpha - \frac{\pi}{2}\right)}{\cos\left(\alpha - \frac{\pi}{2}\right)} = \tan\left(\alpha - \frac{\pi}{2}\right) \\ &= -\tan\left(\frac{\pi}{2} - \alpha\right) = -\cot \alpha \end{aligned}$$

Question 3

(1) $\cos\left(-\frac{22\pi}{5}\right) = \cos\left(-\frac{2\pi}{5}\right) = \cos\frac{2\pi}{5} = \cos\left(\frac{\pi}{2} - \frac{\pi}{10}\right) = \sin\frac{\pi}{10}$

(2) $\sin\left(\frac{39\pi}{8}\right) = \sin\left(\frac{7\pi}{8}\right) = -\sin\left(-\frac{\pi}{8}\right) = \sin\left(\frac{\pi}{8}\right)$

(3) $\tan\left(\frac{80\pi}{7}\right) = \tan\left(\frac{3\pi}{7}\right) = \tan\left(\frac{\pi}{2} - \frac{\pi}{14}\right) = \cot\frac{\pi}{14}$

Question 4

(1) On remarque que $\sin \beta \leq 0$.

$$\cos^2 \beta + \sin^2 \beta = 1$$

$$\Leftrightarrow \left(-\frac{3}{5}\right)^2 + \sin^2 \beta = 1$$

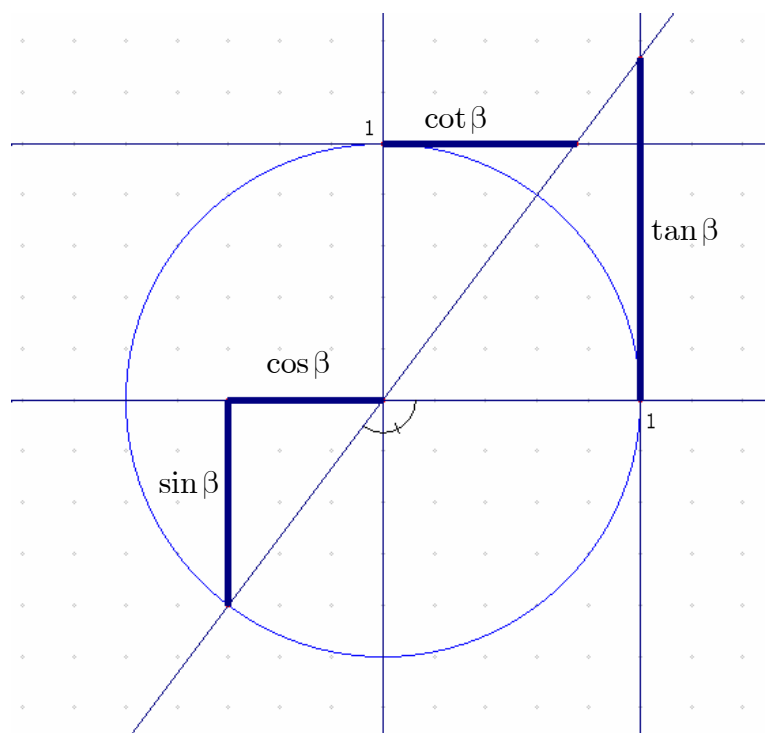
$$\Leftrightarrow \sin^2 \beta = 1 - \frac{9}{25}$$

$$\Leftrightarrow \sin^2 \beta = \frac{16}{25}$$

$$\Leftrightarrow \sin \beta = -\frac{4}{5}$$

Maintenant : $\tan \beta = \frac{\sin \beta}{\cos \beta} = \frac{4}{3}$ et $\cot \beta = \frac{3}{4}$.

$$\beta = \sin^{-1}\left(\frac{4}{5}\right) + \pi \simeq 4,0689 \text{ rad.}$$



(2) On a tout de suite : $\cot \gamma = -\frac{1}{2}$.

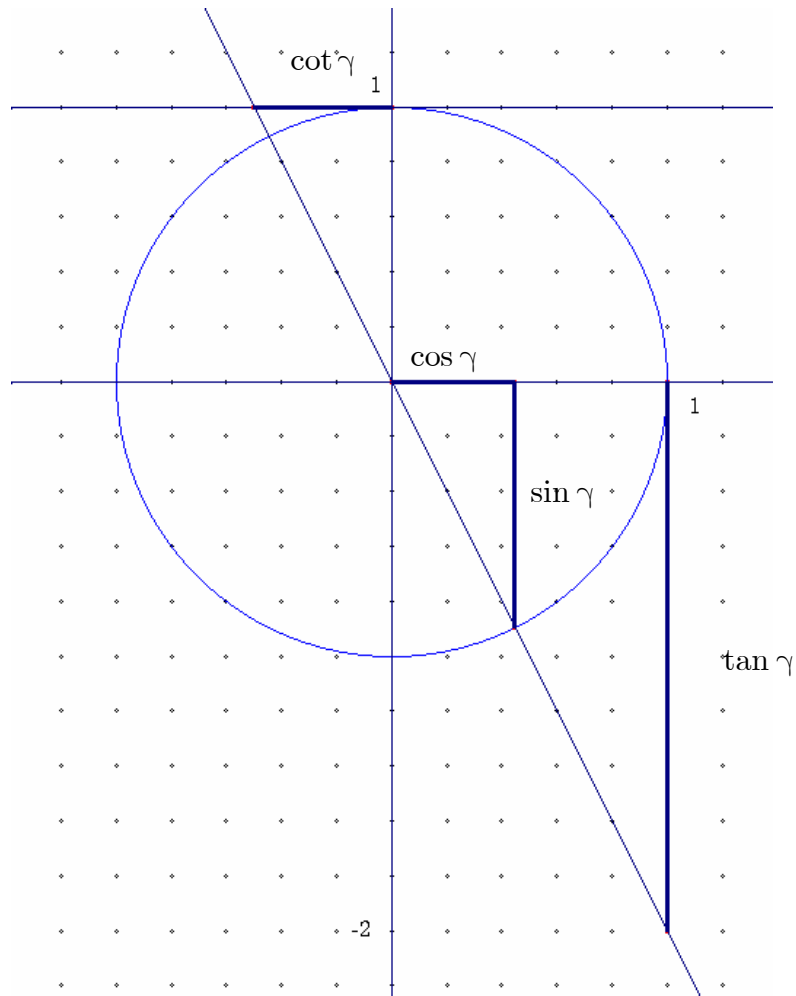
On remarque que $\cos \gamma \geq 0$ et $\sin \gamma \leq 0$.

$$\cos^2 \gamma = \frac{1}{1 + \tan^2 \gamma} = \frac{1}{5} \Rightarrow \cos \gamma = \frac{1}{\sqrt{5}}$$

$$\sin^2 \gamma = \frac{\tan^2 \gamma}{1 + \tan^2 \gamma} = \frac{4}{5} \Rightarrow \sin \gamma = -\frac{2}{\sqrt{5}}$$

$$\gamma = \sin^{-1}\left(-\frac{2}{\sqrt{5}}\right) + 2\pi \simeq -1,1071 + 2\pi \text{ rad}$$

$$\simeq 5,1760 \text{ rad} \in \left[\frac{3\pi}{2}, 2\pi\right]$$



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