Devoir I,3 corrigé

Dienstag, 10. Dezember 2019 16:45

Question 1

α	$\frac{2\pi}{3}$	$\frac{5\pi}{4}$	3π	$-\frac{\pi}{2}$	$-\frac{\pi}{6}$	$\frac{7\pi}{6}$
$\cos\alpha$	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	-1	0	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{2}$
$\sin\alpha$	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	0	-1	$-\frac{1}{2}$	$-\frac{1}{2}$
$\tan\alpha$	$-\sqrt{3}$	1	0	/	$-\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{3}$
$\cot\alpha$	$-\frac{\sqrt{3}}{3}$	1	/	0	$-\sqrt{3}$	$\sqrt{3}$

Question 2

Voir cours

Question 3

a) $\frac{46\pi}{7} \equiv 6\pi + \frac{4\pi}{7} \equiv \frac{4\pi}{7} \in 2^e q.$

m.p.

p.p.m.p.

suppl. compl.

$\cos\frac{4\pi}{7} = -\cos\frac{3\pi}{7} = -\sin\left(\frac{\pi}{2} - \frac{3\pi}{7}\right) = -\sin\frac{\pi}{14}$

$\sin\frac{4\pi}{7} = +\sin\frac{3\pi}{7} = \cos\frac{\pi}{14}$

$\tan\frac{4\pi}{7} = -\tan\frac{3\pi}{7} = -\cot\frac{\pi}{14}$

b) $\beta \equiv -\frac{53\pi}{8} \equiv -6\pi - \frac{5\pi}{8} \equiv -\frac{5\pi}{8} \equiv \frac{11\pi}{8} \in 3^e q.$

m.p. p.p.m.p.

$-\pi$ compl.

$\cos\frac{11\pi}{8} = \cos\left(\pi + \frac{3\pi}{8}\right) = -\cos\frac{3\pi}{8} = -\sin\left(\frac{\pi}{2} - \frac{3\pi}{8}\right) = -\sin\frac{\pi}{8}$

$\sin\frac{11\pi}{8} = -\sin\frac{3\pi}{8} = -\cos\frac{\pi}{8}$

$\tan\frac{11\pi}{8} = \tan\frac{3\pi}{8} = \cot\frac{\pi}{8}$

Question 4

(1) • $\cos^2 x + \sin^2 x = 1$ $\quad (x \in 3^e q.)$

$\Leftrightarrow \cos^2 x + \frac{25}{169} = 1$

$\Leftrightarrow \cos^2 x = \frac{144}{169}$

$\Leftrightarrow \cos x = \frac{12}{13}$ ou $\cos x = -\frac{12}{13}$

à écarter car $x \in 3^e q.$

Donc $\cos x = -\frac{12}{13}$

• $\tan x = \frac{\sin x}{\cos x} = \frac{-5/13}{-12/13} = \frac{5}{12}$

Donc $\cos x = \frac{-12}{13}$

- $\tan x = \frac{\sin x}{\cos x} = \frac{-5/13}{-12/13} = \frac{5}{12}$
- $\cot x = \frac{12}{5}$
- $x \equiv \pi + \cos^{-1}\left(\frac{12}{13}\right) \equiv 3{,}5364$

(2) $y \in 2^e q.$

- $\cos^2 y = \frac{1}{1+(-3/2)^2} = \frac{1}{1+9/4} = \frac{4}{13}$

$\Leftrightarrow \cos y = -\frac{2}{\sqrt{13}}$ ou $\cos y = \frac{2}{\sqrt{13}}$ à écarter car $y \in 2^e q.$

Donc $\cos y = -\frac{2}{\sqrt{13}}$

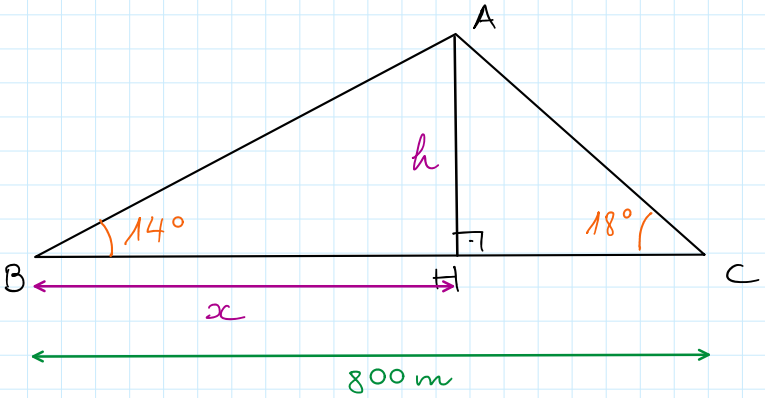
- $\sin^2 y = \frac{9/4}{1+9/4} = \frac{9/4}{13/4} = \frac{9}{13}$

$\Leftrightarrow \sin y = \frac{3}{\sqrt{13}}$ ou $\sin y = -\frac{3}{\sqrt{13}}$ à écarter car $y \in 2^e q.$

Donc $\sin y = \frac{3}{\sqrt{13}}$

- $\cot y = -\frac{2}{3}$
- $y \equiv \cos^{-1}\left(-\frac{2}{\sqrt{13}}\right) \equiv 2{,}1588$

Question 4



① Dans le $\triangle ABH$, rectangle en H:

$\tan 14° = \frac{h}{x} \Leftrightarrow h = x \cdot \tan 14°$ ①

② Dans le $\triangle ACH$, rectangle en H:

$\tan 18° = \frac{h}{800-x} \Leftrightarrow h = (800-x)\cdot \tan 18°$ ②

D'où le système :

$$\begin{cases} h = x \cdot \tan 14° & ① \\ h = (800-x)\cdot \tan 18° & ② \end{cases}$$

① dans ②:

$x \cdot \tan 14° = (800-x)\cdot \tan 18°$

$\Leftrightarrow x\cdot \tan 14° = 800\cdot \tan 18° - x\cdot \tan 18°$

$\Leftrightarrow x\cdot \tan 14° + x\cdot \tan 18° = 800\cdot \tan 18°$

$\Leftrightarrow x\cdot (\tan 14° + \tan 18°) = 800\cdot \tan 18° \;/: (\tan 14° + \tan 18°)$

$\Leftrightarrow x = \frac{800\cdot \tan 18°}{\tan 14° + \tan 18°}$ ③

$(\Leftrightarrow x \approx 452{,}65\ m)$

Donc ③ dans ①:

$h = x\cdot \tan 14° = \frac{800\cdot \tan 18°\cdot \tan 14°}{\tan 14° + \tan 18°} \approx 112{,}86\ m.$