

LUYỆN TẬP (1 tiết)

Gợi ý trả lời câu hỏi và bài tập

20. Viết $225^\circ = -135^\circ + 360^\circ$, $-225^\circ = 135^\circ - 360^\circ$,

$$750^\circ = 30^\circ + 720^\circ, \quad -510^\circ = -150^\circ - 360^\circ,$$

$$\frac{5\pi}{3} = -\frac{\pi}{3} + 2\pi, \quad \frac{11\pi}{6} = -\frac{\pi}{6} + 2\pi,$$

$$\frac{-10\pi}{3} = \frac{2\pi}{3} - 4\pi, \quad \frac{-17\pi}{3} = \frac{\pi}{3} - 6\pi$$

thì được bảng :

	225°	-225°	750°	-510°	$\frac{5\pi}{3}$	$\frac{11\pi}{6}$	$-\frac{10\pi}{3}$	$-\frac{17\pi}{3}$
sin	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{2}$
cos	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$
tan	1	-1	$\frac{1}{\sqrt{3}}$	$\frac{1}{\sqrt{3}}$	$-\sqrt{3}$	$-\frac{1}{\sqrt{3}}$	$-\sqrt{3}$	$\sqrt{3}$
cot	1	-1	$\sqrt{3}$	$\sqrt{3}$	$-\frac{1}{\sqrt{3}}$	$-\sqrt{3}$	$-\frac{1}{\sqrt{3}}$	$\frac{1}{\sqrt{3}}$

258

$$\begin{aligned}
 \text{c) } \frac{2}{\tan \alpha - 1} + \frac{\cot \alpha + 1}{\cot \alpha - 1} &= \frac{2}{\tan \alpha - 1} + \frac{\frac{1}{\tan \alpha} + 1}{\frac{1}{\tan \alpha} - 1} \\
 &= \frac{2}{\tan \alpha - 1} + \frac{1 + \tan \alpha}{1 - \tan \alpha} = \frac{1 - \tan \alpha}{\tan \alpha - 1} = -1.
 \end{aligned}$$

21. Có bảng dấu :

	I	II	III	IV
sin	+	+	-	-
cos	+	-	-	+
tan	+	-	+	-
cot	+	-	+	-

M trong các góc phần tư I, III thì $\sin \alpha$, $\cos \alpha$ cùng dấu (tức $\tan \alpha > 0$).

M trong các góc phần tư II, III thì $\sin \alpha$, $\tan \alpha$ khác dấu (tức $\cos \alpha < 0$).

22. a) $\cos^4 \alpha - \sin^4 \alpha = (\cos^2 \alpha + \sin^2 \alpha)(\cos^2 \alpha - \sin^2 \alpha) =$

$$= \cos^2 \alpha - \sin^2 \alpha = \cos^2 \alpha - (1 - \cos^2 \alpha) = 2\cos^2 \alpha - 1.$$

b) $1 - \cot^4 \alpha = (1 + \cot^2 \alpha)(1 - \cot^2 \alpha)$

$$= \frac{1}{\sin^2 \alpha} \left(1 - \frac{\cos^2 \alpha}{\sin^2 \alpha} \right) = \frac{1}{\sin^2 \alpha} \left[\frac{\sin^2 \alpha - (1 - \sin^2 \alpha)}{\sin^2 \alpha} \right]$$

$$= \frac{2\sin^2 \alpha - 1}{\sin^4 \alpha} = \frac{2}{\sin^2 \alpha} - \frac{1}{\sin^4 \alpha}.$$

c) $\frac{1 + \sin^2 \alpha}{1 - \sin^2 \alpha} = \frac{1 + \sin^2 \alpha}{\cos^2 \alpha} = \frac{1}{\cos^2 \alpha} + \tan^2 \alpha = 1 + 2\tan^2 \alpha.$

23. a) $\sqrt{\sin^4 \alpha + 4(1 - \sin^2 \alpha)} = \sqrt{(2 - \sin^2 \alpha)^2} = 2 - \sin^2 \alpha$ (để ý rằng $\sin^2 \alpha \leq 1$);

$$\sqrt{\cos^4 \alpha + 4(1 - \cos^2 \alpha)} = \sqrt{(2 - \cos^2 \alpha)^2} = 2 - \cos^2 \alpha \text{ (để ý rằng } \cos^2 \alpha \leq 1).$$

Vậy $\sqrt{\sin^4 \alpha + 4\cos^2 \alpha} + \sqrt{\cos^4 \alpha + 4\sin^2 \alpha} = 4 - \sin^2 \alpha - \cos^2 \alpha = 4 - 1 = 3.$

b) $\sin^6 \alpha + \cos^6 \alpha = (\sin^2 \alpha + \cos^2 \alpha)^3 - 3\sin^2 \alpha \cos^2 \alpha (\sin^2 \alpha + \cos^2 \alpha)$

$$= 1 - 3\sin^2 \alpha \cos^2 \alpha;$$

$$\cos^4 \alpha + \sin^4 \alpha = (\cos^2 \alpha + \sin^2 \alpha)^2 - 2\sin^2 \alpha \cos^2 \alpha = 1 - 2\sin^2 \alpha \cos^2 \alpha.$$

Suy ra $2(\sin^6 \alpha + \cos^6 \alpha) - 3(\cos^4 \alpha + \sin^4 \alpha) =$

$$= 2 - 6\sin^2 \alpha \cos^2 \alpha - 3(1 - 2\sin^2 \alpha \cos^2 \alpha) = 2 - 3 = -1.$$