Bài Tập Trắc Nghiệm
ĐÚNG SAI
CÔNG THỨC LƯỢNG GIÁC

Câu 1. Cho biết $\sin\alpha=\frac{1}{3}$ và $\frac{\pi}{2}<\alpha<\pi$. Khi đó:

a) $\cos\alpha=-\frac{2\sqrt{2}}{3}$

b) $\sin 2\alpha=-\frac{4\sqrt{2}}{9}$

c) $\cos 2\alpha=\frac{7}{9}$

d) $\cot 2\alpha=\frac{7\sqrt{2}}{8}$

Lời giải

a) Đúng	b) Đúng	c) Đúng	d) Sai

Vì $\frac{\pi}{2}<\alpha<\pi$ nên $\cos\alpha<0$.

Ta có: $\cos^2\alpha=1-\sin^2\alpha=1-\frac{1}{9}=\frac{8}{9}\Rightarrow\cos\alpha=-\frac{2\sqrt{2}}{3}$

$\sin 2\alpha=2\sin\alpha\cos\alpha=2\cdot\frac{1}{3}\cdot\left(-\frac{2\sqrt{2}}{3}\right)=-\frac{4\sqrt{2}}{9}$

$\cos 2\alpha=1-2\sin^2\alpha=1-2\left(\frac{1}{3}\right)^2=\frac{7}{9}$

$\tan 2\alpha=\frac{\sin 2\alpha}{\cos 2\alpha}=-\frac{4\sqrt{2}}{7};\cot 2\alpha=\frac{1}{\tan 2\alpha}=-\frac{7\sqrt{2}}{8}$

Câu 2. Cho biết $\cos 2\alpha=-\frac{1}{4}$ và $\pi<\alpha<\frac{3\pi}{2}$. Khi đó:

a) $\sin\alpha<0,\cos\alpha<0$

b) $\sin\alpha=\frac{\sqrt{10}}{4}$

c) $\cos\alpha=\frac{\sqrt{6}}{4}$

d) $\cot\alpha=\frac{\sqrt{15}}{5}$

Lời giải

a) Đúng	b) Sai	c) Sai	d) Đúng

Vì $\pi<\alpha<\frac{3\pi}{2}$ nên $\sin\alpha<0,\cos\alpha<0$.

Ta có: $\cos 2\alpha = -\frac{1}{4} \Rightarrow 1-2\sin^2\alpha = -\frac{1}{4} \Rightarrow \sin^2\alpha = \frac{5}{8} \Rightarrow \sin\alpha = -\frac{\sqrt{10}}{4}$;

$\cos\alpha = -\sqrt{1-\sin^2\alpha} = -\sqrt{1-\frac{10}{16}} = -\frac{\sqrt{6}}{4}$;

$\tan\alpha = \frac{\sin\alpha}{\cos\alpha} = \frac{\sqrt{15}}{3}$

$\cot\alpha = \frac{1}{\tan\alpha} = \frac{\sqrt{15}}{5}$

Câu 3. Cho biết $\sin\alpha = \frac{3}{5}, \frac{\pi}{2} < \alpha < \pi$. Khi đó:

a) $\cos\alpha < 0$

b) $\cos\alpha = -\frac{4}{5}$

c) $\tan\alpha = \frac{3}{4}$

d) $\tan\left(\alpha + \frac{\pi}{3}\right) = \frac{48-\sqrt{3}}{11}$

Lời giải

a) Đúng	b) Đúng	c) Sai	d) Sai

Vì $\frac{\pi}{2} < \alpha < \pi \Rightarrow \cos\alpha < 0.$

Ta có $\cos\alpha = -\sqrt{1-\sin^2\alpha} = -\frac{4}{5}$

$\Rightarrow \tan\alpha = \frac{\sin\alpha}{\cos\alpha} = -\frac{3}{4}.$

Ta có: $\tan\left(\alpha + \frac{\pi}{3}\right) = \frac{\tan\alpha + \tan\frac{\pi}{3}}{1-\tan\alpha\tan\frac{\pi}{3}} = \frac{\tan\alpha + \sqrt{3}}{1-\sqrt{3}\tan\alpha}.$

Suy ra: $\tan\left(\alpha + \frac{\pi}{3}\right) = \frac{-\frac{3}{4}+\sqrt{3}}{1-\sqrt{3}\left(-\frac{3}{4}\right)} = \frac{-3+4\sqrt{3}}{4+3\sqrt{3}} = \frac{48-25\sqrt{3}}{11}.$

Câu 4. Cho biết $\sin\alpha = -\frac{12}{13}, \frac{3\pi}{2} < \alpha < 2\pi$. Khi đó:

a) $\cos\alpha > 0$

b) $\cos\alpha = \frac{5}{13}$

c) $\tan\alpha = -\frac{12}{5}$

d) $\cos\left(\frac{\pi}{3} - \alpha\right) = \frac{5-\sqrt{3}}{26}$

Lời giải

a) Đúng	b) Đúng	c) Đúng	d) Sai

Ta có: $\cos\left(\frac{\pi}{3}-\alpha\right)=\cos\frac{\pi}{3}\cos\alpha+\sin\frac{\pi}{3}\sin\alpha$

$=\frac{1}{2}\cos\alpha+\frac{\sqrt{3}}{2}\cdot\left(-\frac{12}{13}\right)=\frac{1}{2}\cos\alpha-\frac{6\sqrt{3}}{13}$.

Vì $\frac{3\pi}{2}<\alpha<2\pi\Rightarrow\cos\alpha>0$.

Ta có $\cos\alpha=\sqrt{1-\sin^2\alpha}=\frac{5}{13}$.

Suy ra: $\cos\left(\frac{\pi}{3}-\alpha\right)=\frac{1}{2}\cdot\frac{5}{13}-\frac{6\sqrt{3}}{13}=\frac{5-12\sqrt{3}}{26}$.

Câu 5. Cho biết $\sin x=\frac{1}{\sqrt{3}}$ và $0<x<\frac{\pi}{2}$; khi đó:

a) $\cos x>0$

b) $\cos x=\frac{\sqrt{6}}{3}$

c) $\tan x=\frac{\sqrt{3}}{3}$

d) $\cos\left(x+\frac{\pi}{3}\right)=\frac{\sqrt{6}-3}{8}$.

Lời giải

a) Đúng	b) Đúng	c) Sai	d) Sai

a) Vì $0<x<\frac{\pi}{2}$ nên $\cos x>0$.

Ta có: $\sin x=\frac{1}{\sqrt{3}}\Rightarrow\cos x=\sqrt{1-\sin^2 x}=\sqrt{1-\frac{1}{3}}=\frac{\sqrt{6}}{3}$.

$\cos\left(x+\frac{\pi}{3}\right)=\cos x\cos\frac{\pi}{3}-\sin x\sin\frac{\pi}{3}=\frac{\sqrt{6}}{3}\cdot\frac{1}{2}-\frac{1}{\sqrt{3}}\cdot\frac{\sqrt{3}}{2}=\frac{\sqrt{6}-3}{6}$.

Câu 6. Cho biết $\cos x=-\frac{12}{13}$ và $\pi<x<\frac{3\pi}{2}$; khi đó:

a) $\sin x>0$

b) $\sin x=-\frac{5}{13}$

c) $\cot x=\frac{5}{12}$

d) $\sin\left(\frac{\pi}{3}-x\right)=\frac{5-12\sqrt{3}}{26}$

Lời giải

a) Sai	b) Đúng	c) Sai	d) Đúng

Vì $\pi<x<\frac{3\pi}{2}$ nên $\sin x<0$.

Ta có: $\cos x=-\frac{12}{13}\Rightarrow \sin x=-\sqrt{1-\cos^2 x}=-\sqrt{1-\left(-\frac{12}{13}\right)^2}=-\frac{5}{13}$.

$\sin\left(\frac{\pi}{3}-x\right)=\sin\frac{\pi}{3}\cos x-\cos\frac{\pi}{3}\sin x=\frac{\sqrt{3}}{2}\left(-\frac{12}{13}\right)-\frac{1}{2}\left(-\frac{5}{13}\right)=\frac{5-12\sqrt{3}}{26}$

Câu 7. Cho biết $\tan x=\sqrt{2}$ và $0<x<90^\circ$. Khi đó:

a) $\cos x>0$

b) $\cos x=\frac{\sqrt{3}}{3}$

c) $\sin x=\frac{\sqrt{6}}{3}$

d) $\cos\left(x-30^\circ\right)=\frac{3-\sqrt{6}}{6}$

Lời giải

a) Đúng	b) Đúng	c) Đúng	d) Sai

Vì $0<x<90^\circ$ nên $\cos x>0$.

Ta có: $\frac{1}{\cos^2 x}=1+\tan^2 x=1+2=3\Rightarrow\cos^2 x=\frac{1}{3}\Rightarrow\cos x=\frac{\sqrt{3}}{3}$.

Mặt khác: $\tan x=\frac{\sin x}{\cos x}\Rightarrow\sin x=\tan x\cos x=\frac{\sqrt{6}}{3}$.

$\cos\left(x-30^\circ\right)=\cos x\cos 30^\circ+\sin x\sin 30^\circ\frac{\sqrt{3}}{3}\cdot\frac{\sqrt{3}}{2}+\frac{\sqrt{6}}{3}\cdot\frac{1}{2}=\frac{3+\sqrt{6}}{6}$

Câu 8. Biết $\sin a=\frac{8}{17},\tan b=\frac{5}{12}$ và a, b là các góc nhọn. Khi đó:

a) $\tan a=\frac{8}{15}$

b) $\sin(a-b)=\frac{21}{221}$

c) $\cos(a+b)=\frac{14}{22}$

d) $\tan(a+b)=\frac{17}{14}$.

Lời giải

a) Đúng	b) Đúng	c) Sai	d) Sai

Vì a,b là các góc nhọn nên $\cos a>0,\cos b>0$.

Ta có: $\cos a=\sqrt{1-\sin^2 a}=\frac{15}{17}\Rightarrow\tan a=\frac{\sin a}{\cos a}=\frac{8}{15}$;

$\cos b=\sqrt{\frac{1}{1+\tan^2 b}}=\frac{12}{13}\Rightarrow\sin b=\cos b\tan b=\frac{5}{13}$. Khi đó:

$\sin(a-b)=\sin a\cos b-\cos a\sin b=\frac{8}{17}\cdot\frac{12}{13}-\frac{15}{17}\cdot\frac{5}{13}=\frac{21}{221}$.

$\cos(a+b)=\cos a\cos b-\sin a\sin b=\frac{15}{17}\cdot\frac{12}{13}-\frac{8}{17}\cdot\frac{5}{13}=\frac{140}{221}$

$\tan(a+b)=\frac{\tan a+\tan b}{1-\tan a\tan b}=\frac{\frac{8}{15}+\frac{5}{12}}{1-\frac{8}{15}\cdot\frac{5}{12}}=\frac{171}{140}.$

Câu 9. Biết $0<a,b<\frac{\pi}{2}, a+b=\frac{\pi}{4}$ và $\tan a\tan b=3-2\sqrt{2}$. Khi đó:

a) $\tan a+\tan b=-2+2\sqrt{2}.$

b) $\tan a=-1+\sqrt{2}$

c) $\tan b=-1-\sqrt{2}$

d) $\tan a-\tan b=-2-2\sqrt{2}.$

Lời giải

a) Đúng	b) Đúng	c) Sai	d) Sai

$\tan(a+b)=\frac{\tan a+\tan b}{1-\tan a\tan b}\Rightarrow\tan a+\tan b=\tan(a+b)(1-\tan a\tan b)$ mà $a+b=\frac{\pi}{4}$ và $\tan a\tan b=3-2\sqrt{2}$

$\Rightarrow\tan a+\tan b=\tan\frac{\pi}{4}[1-(3-2\sqrt{2})]=-2+2\sqrt{2}.$

Đặt $S=\tan a+\tan b; P=\tan a\tan b.$

Khi đó $\tan a,\tan b$ là nghiệm của phương trình

$X^2-SX+P=0\Leftrightarrow X^2-(2\sqrt{2}-2)X+3-2\sqrt{2}=0$

$\Leftrightarrow X=-1+\sqrt{2}.$ Suy ra $\tan a=\tan b=-1+\sqrt{2}.$

Câu 10. Biết $\tan\alpha=2$. Khi đó:

a) $\cot\alpha=-\frac{1}{2}$

b) $\cos 2\alpha=-\frac{3}{5}$

c) $\sin 2\alpha=\frac{4}{5}$

d) $\tan 2\alpha=-\frac{4}{3}$

Lời giải

a) Sai	b) Đúng	c) Đúng	d) Đúng

Ta có: $\cos 2\alpha=2\cos^2\alpha-1=\frac{2}{\tan^2\alpha+1}-1=\frac{2}{5}-1=-\frac{3}{5};$

$\sin 2\alpha=2\sin\alpha\cos\alpha=2\tan\alpha\cos^2\alpha=\frac{2\tan\alpha}{\tan^2\alpha+1}=\frac{4}{5}; \tan 2\alpha=\frac{\sin 2\alpha}{\cos 2\alpha}=-\frac{4}{3}.$

Câu 11. Biết $\sin 2\alpha=-\frac{4}{5}, \frac{\pi}{2}<\alpha<\frac{3\pi}{2}$. Khi đó:

a) $\cos\alpha<0$

b) $2\sin\alpha\cos\alpha=-\frac{4}{5}$

c) $\cos\alpha=\dfrac{-2}{\sqrt{5}},\sin\alpha=\dfrac{1}{\sqrt{5}}$

d) $\cos\alpha=\dfrac{-1}{\sqrt{5}},\sin\alpha=-\dfrac{2}{\sqrt{5}}$

Lời giải

a) Đúng	b) Đúng	c) Đúng	d) Sai

Vì $\dfrac{\pi}{2}<\alpha<\dfrac{3\pi}{2}$ nên $\cos\alpha<0$. Ta có hệ: $\begin{cases}\sin^2\alpha+\cos^2\alpha=1\\2\sin\alpha\cos\alpha=-\dfrac{4}{5}\end{cases}$

$$\Rightarrow\begin{cases}\dfrac{4}{25\cos^2\alpha}+\cos^2\alpha=1\\ \sin\alpha=-\dfrac{2}{5\cos\alpha}\end{cases}\Rightarrow\begin{cases}25\cos^4\alpha-25\cos^2\alpha+4=0\\ \sin\alpha=-\dfrac{2}{5\cos\alpha}\end{cases}$$

$$\Rightarrow\begin{cases}\left[\begin{array}{l}\cos^2\alpha=\dfrac{4}{5}\\ \cos^2\alpha=\dfrac{1}{5}\end{array}\right.\\ \sin\alpha=-\dfrac{2}{5\cos\alpha}\end{cases}\Rightarrow\begin{cases}\left[\begin{array}{l}\cos\alpha=\dfrac{-2}{\sqrt{5}}\\ \cos\alpha=\dfrac{-1}{\sqrt{5}}\end{array}\right.\\ \sin\alpha=-\dfrac{2}{5\cos\alpha}\end{cases}\Rightarrow\left[\begin{array}{l}\cos\alpha=\dfrac{-2}{\sqrt{5}},\sin\alpha=\dfrac{1}{\sqrt{5}}\\ \cos\alpha=\dfrac{-1}{\sqrt{5}},\sin\alpha=\dfrac{2}{\sqrt{5}}\end{array}\right.$$

Câu 12. Cho $\sin\alpha=\dfrac{2}{3},\dfrac{\pi}{2}<\alpha<\pi$. Khi đó:

a) $\cos\alpha=-\dfrac{\sqrt{5}}{3}$

b) $\tan\alpha=-\dfrac{2\sqrt{5}}{5}$

c) $\cos\left(\dfrac{\pi}{3}+\alpha\right)=\dfrac{\sqrt{5}-2\sqrt{3}}{6}$

d) $\cos\left(\dfrac{\pi}{4}-\alpha\right)=\dfrac{\sqrt{10}-2\sqrt{2}}{6}$

Lời giải

a) Đúng	b) Đúng	c) Sai	d) Sai

$\sin\alpha=\dfrac{2}{3},\dfrac{\pi}{2}<\alpha<\pi$

Ta có: $\cos^2\alpha=1-\sin^2\alpha=1-\left(\dfrac{2}{3}\right)^2=\dfrac{5}{9}\Rightarrow\cos\alpha=\pm\dfrac{\sqrt{5}}{3}$

Vì $\dfrac{\pi}{2}<\alpha<\pi$ nên $\cos\alpha=-\dfrac{\sqrt{5}}{3}$

$\tan\alpha=\dfrac{\sin\alpha}{\cos\alpha}=-\dfrac{2\sqrt{5}}{5}$.

$\cos\left(\dfrac{\pi}{3}+\alpha\right)=\cos\dfrac{\pi}{3}\cos\alpha-\sin\dfrac{\pi}{3}\sin\alpha=\dfrac{1}{2}\cdot\left(\dfrac{-\sqrt{5}}{3}\right)-\dfrac{\sqrt{3}}{2}\cdot\dfrac{2}{3}=\dfrac{-\sqrt{5}-2\sqrt{3}}{6}$

$\cos\left(\frac{\pi}{4}-\alpha\right)=\cos\frac{\pi}{4}\cos\alpha+\sin\frac{\pi}{4}\sin\alpha=\frac{\sqrt{2}}{2}\cdot\left(\frac{-\sqrt{5}}{3}\right)+\frac{\sqrt{2}}{2}\cdot\frac{2}{3}=\frac{-\sqrt{10}+2\sqrt{2}}{6}$.

Câu 13. Cho $\cot x=-\sqrt{3},\frac{3\pi}{2}<x<2\pi$. Khi đó:

a) $\sin x=-\frac{\sqrt{10}}{10}$

b) $\cos x=\frac{\sqrt{3}}{10}$

c) $\sin\left(\frac{4\pi}{3}-x\right)=\frac{-\sqrt{10}}{5}$

d) $\tan\left(x+\frac{\pi}{3}\right)=\frac{\sqrt{3}}{3}$

Lời giải

a) Đúng	b) Sai	c) Đúng	d) Đúng

$\cot x=-\sqrt{3},\frac{3\pi}{2}<x<2\pi$

$\frac{1}{\sin^2 x}=1+\cot^2 x=1+(-\sqrt{3})^2=10\Rightarrow\sin^2 x=\frac{1}{10}\Rightarrow\sin x=\pm\frac{\sqrt{10}}{10}$

Vì $\frac{3\pi}{2}<x<2\pi$ nên $\sin x=-\frac{\sqrt{10}}{10}$

$\cos x=\cot x\cdot\sin x=-\sqrt{3}.\left(-\frac{\sqrt{10}}{10}\right)=\frac{\sqrt{30}}{10}$.

$\sin\left(\frac{4\pi}{3}-x\right)=\sin\frac{4\pi}{3}\cos x-\cos\frac{4\pi}{3}\sin x=-\frac{\sqrt{3}}{2}\cdot\left(\frac{\sqrt{30}}{10}\right)-\frac{-1}{2}\cdot\frac{-\sqrt{10}}{10}=\frac{-\sqrt{10}}{5}$

$\tan x=\frac{1}{\cot x}=-\frac{\sqrt{3}}{3}$

$\tan\left(x+\frac{\pi}{3}\right)=\frac{\tan x+\tan\frac{\pi}{3}}{1-\tan x\cdot\tan\frac{\pi}{3}}=\frac{\frac{-\sqrt{3}}{3}+\sqrt{3}}{1-\frac{-\sqrt{3}}{3}\cdot\sqrt{3}}=\frac{\sqrt{3}}{3}$.

Câu 14. Biết: $\sin\alpha=\frac{1}{3}$ và $0<\alpha<\frac{\pi}{2}$. Khi đó:

a) $\sin 2\alpha=\frac{\sqrt{2}}{9}$

b) $\cos 2\alpha=\frac{7}{9}$

c) $\tan 2\alpha=\frac{\sqrt{2}}{7}$

d) $\cot 2\alpha=\frac{7\sqrt{2}}{2}$

Lời giải

a) Sai	b) Đúng	c) Sai	d) Sai

Ta có: $\sin\alpha=\frac{1}{3}$ và $0<\alpha<\frac{\pi}{2}$.

$\cos^2\alpha=1-\sin^2\alpha=1-\left(\frac{1}{3}\right)^2=\frac{8}{9}\Rightarrow\cos\alpha=\pm\frac{2\sqrt{2}}{3}$

Vì $0<\alpha<\frac{\pi}{2}$ nên $\cos\alpha=\frac{2\sqrt{2}}{3}$

$\sin 2\alpha=2\sin\alpha\cdot\cos\alpha=2\cdot\frac{1}{3}\cdot\frac{2\sqrt{2}}{3}=\frac{4\sqrt{2}}{9}$

$\cos 2\alpha=\cos^2\alpha-\sin^2\alpha=\left(\frac{2\sqrt{2}}{3}\right)^2-\left(\frac{1}{3}\right)^2=\frac{7}{9}$

$\tan 2\alpha=\frac{\sin 2\alpha}{\cos 2\alpha}=\frac{4\sqrt{2}}{2}:\frac{7}{9}=\frac{4\sqrt{2}}{7}$

$\cot 2\alpha=\frac{\cos 2\alpha}{\sin 2\alpha}=\frac{4\sqrt{2}}{2}:\frac{7}{9}=\frac{7\sqrt{2}}{8}$.

Câu 15. Cho $\cos\alpha=\frac{2}{5},2\pi<\alpha<\frac{5\pi}{2}$, khi đó:

a) $\sin\alpha=\frac{\sqrt{21}}{5}$

b) $\sin 2\alpha=\frac{4\sqrt{21}}{25}$

c) $\cos 2\alpha=-\frac{17}{25}$

d) $\tan 2\alpha=\frac{-4\sqrt{21}}{17}$

Lời giải

a) Đúng	b) Đúng	c) Đúng	d) Đúng

$\cos\alpha=\frac{2}{5},2\pi<\alpha<\frac{5\pi}{2}$.

$\sin^2\alpha=1-\cos^2\alpha=1-\left(\frac{2}{5}\right)^2=\frac{21}{25}\Rightarrow\sin\alpha=\pm\frac{\sqrt{21}}{5}$

Vì $2\pi<\alpha<\frac{5\pi}{2}$ nên $\sin\alpha=\frac{\sqrt{21}}{5}$

$\sin 2\alpha=2\sin\alpha\cos\alpha=2\cdot\frac{\sqrt{21}}{5}\cdot\frac{2}{5}=\frac{4\sqrt{21}}{25}$

$\cos 2\alpha=\cos^2\alpha-\sin^2\alpha=\left(\frac{2}{5}\right)^2-\left(\frac{\sqrt{21}}{5}\right)^2=-\frac{17}{25}$

$\tan 2\alpha=\frac{\sin 2\alpha}{\cos 2\alpha}=\frac{4\sqrt{21}}{25}:\frac{-17}{25}=\frac{-4\sqrt{21}}{17}$.

Câu 16. Biết: $\cos 2\alpha=\frac{5}{9},0^\circ<\alpha<90^\circ$. Khi đó:

a) $\sin\alpha=\frac{\sqrt{28}}{9}$ b) $\cos\alpha=\frac{\sqrt{53}}{9}$ c) $\tan\alpha=\frac{\sqrt{371}}{53}$ d) $\cot\alpha=\frac{\sqrt{371}}{14}$

Lời giải

a) Đúng	b) Đúng	c) Sai	d) Đúng

Ta có: $\cos 2\alpha=\frac{5}{9}, 0^\circ<\alpha<90^\circ$

$\sin^2\alpha=\frac{1-\cos 2\alpha}{2}=\frac{1-\left(\frac{5}{9}\right)^2}{2}=\frac{28}{81}\Rightarrow\sin\alpha=\pm\frac{\sqrt{28}}{9}$

Vì $0^\circ<\alpha<90^\circ$ nên $\sin\alpha=\frac{\sqrt{28}}{9}$

$\cos^2\alpha=1-\sin^2\alpha=1-\left(\frac{\sqrt{28}}{9}\right)^2=\frac{53}{81}\Rightarrow\cos\alpha=\pm\frac{\sqrt{53}}{81}$

Vì $0^\circ<\alpha<90^\circ$ nên $\cos\alpha=\frac{\sqrt{53}}{9}$

$\tan\alpha=\frac{\sin\alpha}{\cos\alpha}=\frac{2\sqrt{371}}{53}$

$\cot\alpha=\frac{1}{\tan\alpha}=\frac{\sqrt{371}}{14}$.

Câu 17. Biến đổi được các biểu thức sau về dạng tích số. Khi đó:

a) $\cos 3x+\cos x=2\cos 2x\cdot\cos 3x$ b) $\sin 3x+\sin 2x=2\sin 2x\cos\frac{x}{2}$;

c) $\cos 4x-\cos x=-2\sin\frac{5x}{2}\sin\frac{3x}{2}$ d) $\sin 5x-\sin x=2\cos 3x\sin 2x$

Lời giải

a) Sai	b) Sai	c) Đúng	d) Đúng

a) $\cos 3x+\cos x=2\cos 2x\cdot\cos x$

b) $\sin 3x+\sin 2x=2\sin\frac{5x}{2}\cos\frac{x}{2}$;

c) $\cos 4x-\cos x=-2\sin\frac{5x}{2}\sin\frac{3x}{2}$

d) $\sin 5x-\sin x=2\cos 3x\sin 2x$

Câu 18. Cho $\sin x=\frac{1}{5}, \frac{\pi}{2}<x<\pi$. Khi đó:

a) $\sin 2x=\frac{4\sqrt{6}}{5}$.

b) $\cos 2x=\frac{23}{25}$

c) $\tan 2x=\frac{20\sqrt{6}}{3}$

d) $\cot 2x=\frac{23\sqrt{6}}{120}$

Lời giải

a) Sai	b) Đúng	c) Sai	d) Sai

$\frac{\pi}{2}<x<\pi \Rightarrow \frac{2\pi}{2}<2x<2\pi \Rightarrow \pi<2x<2\pi \Rightarrow \sin 2x<0.$

$\frac{\pi}{2}<x<\pi \Rightarrow \cos x<0$

$\sin x=\frac{1}{5} \Rightarrow \cos x=-\sqrt{1-\sin^2 x}=-\frac{2\sqrt{6}}{5}.$

$\sin 2x=2\sin x\cdot\cos x=2\cdot\frac{1}{5}\cdot\left(-\frac{2\sqrt{6}}{5}\right)=-\frac{4\sqrt{6}}{5}.$

$\frac{\pi}{2}<x<\pi \Rightarrow \frac{2\pi}{2}<2x<2\pi \Rightarrow \pi<2x<2\pi \Rightarrow \cos 2x>0.$

$\cos 2x=1-2\sin^2 x=1-2\cdot\frac{1}{25}=\frac{23}{25}.$

$\tan 2x=\frac{\sin 2x}{\cos 2x}=\frac{-\frac{4\sqrt{6}}{5}}{\frac{23}{25}}=-\frac{20\sqrt{6}}{3}.\cot 2x=\frac{\cos 2x}{\sin 2x}=\frac{\frac{23}{25}}{-\frac{4\sqrt{6}}{5}}=-\frac{23\sqrt{6}}{120}.$

Câu 19. Cho $\cos x=\frac{1}{5},\frac{\pi}{2}<x<\pi$. Khi đó:

a) $\sin\frac{x}{2}=\frac{\sqrt{10}}{4}$ b) $\cos\frac{x}{2}=\frac{\sqrt{15}}{4}$ c) $\tan\frac{x}{2}=\frac{\sqrt{6}}{3}$ d) $\cot\frac{x}{2}=\frac{\sqrt{6}}{2}$

Lời giải

a) Sai	b) Sai	c) Đúng	d) Đúng

$\frac{\pi}{2}<x<\pi \Rightarrow \frac{\pi}{4}<\frac{x}{2}<\frac{\pi}{2} \Rightarrow \sin\frac{x}{2}>0.$

$\sin\frac{x}{2}=\sqrt{\frac{1-\cos x}{2}}=\sqrt{\frac{1-\frac{1}{5}}{2}}=\frac{\sqrt{10}}{5}$.

$\frac{\pi}{2}<x<\pi \Rightarrow \frac{\pi}{4}<\frac{x}{2}<\frac{\pi}{2} \Rightarrow \cos\frac{x}{2}>0.$

$\cos\frac{x}{2}=\sqrt{\frac{1+\cos x}{2}}=\sqrt{\frac{1+\frac{1}{5}}{2}}=\frac{\sqrt{15}}{5}.$

$\tan\frac{x}{2}=\frac{\sin\frac{x}{2}}{\cos\frac{x}{2}}=\frac{\frac{\sqrt{10}}{5}}{\frac{\sqrt{15}}{5}}=\frac{\sqrt{6}}{3}.$

$\cot\frac{x}{2}=\frac{\cos\frac{x}{2}}{\sin\frac{x}{2}}=\frac{\frac{\sqrt{15}}{5}}{\frac{\sqrt{10}}{5}}=\frac{\sqrt{6}}{2}.$