نام و نام خانوادگی ....ماهان بابائیان........ پاسخنامه تشریحی تکلیف شماره ۲۷..... کلاس یازدهم ... - B........

۱

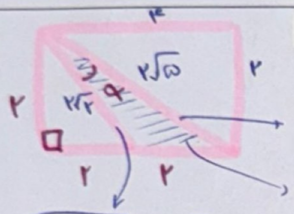
$S = 4/5$

$\sqrt{3}$, 6

$S=\frac{1}{2}ab\sin\alpha \to \frac{1}{2}\times 6\times\sqrt{3}\times\sin\alpha=\frac{9}{2}$

$\sin\alpha=\frac{3}{2\sqrt{3}}\times\frac{\sqrt{3}}{\sqrt{3}}=\frac{\sqrt{3}}{2} \Rightarrow \alpha=60^\circ$ یا $120^\circ \Rightarrow \frac{max}{min}=\frac{120}{60}=2$

۲



$\cot\alpha=?$

$\sqrt{4^2+2^2}=\sqrt{20}=2\sqrt{5}$

$\sqrt{2^2+2^2}=2\sqrt{2}$

فرمول کسینوس ها $\to 2=\sqrt{(2\sqrt{2})^2+(2\sqrt{5})^2-2\times2\sqrt{2}\times2\sqrt{5}\times\cos\alpha}$

$2=\sqrt{\underbrace{8+20}_{28}-8\sqrt{10}\cos\alpha} \Rightarrow$ توان ۲ $\Rightarrow 4=28-8\sqrt{10}\cos\alpha \Rightarrow$

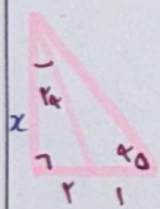
$8\sqrt{10}\cos\alpha=24 \to \cos\alpha=\frac{24}{8\sqrt{10}}\times\frac{\sqrt{10}}{\sqrt{10}}$

$\cos\alpha=\frac{3\sqrt{10}}{10}$

$1+\tan^2\alpha=\frac{1}{\cos^2\alpha}\Rightarrow\tan^2\alpha=\frac{10}{9}-1\Rightarrow\frac{1}{9}\Rightarrow\tan\alpha=\frac{1}{3}$

$\cot\alpha=3$

۳



$\cot\alpha=?$

$\tan2\alpha=\frac{2}{x}\to\tan2\alpha=\frac{2\tan\alpha}{1-\tan^2\alpha}\Rightarrow\frac{2}{x}=\frac{\frac{2x}{3}}{1-\frac{x^2}{9}}\Rightarrow\frac{18x}{3(9-x^2)}=$

$\tan\alpha=\frac{x}{3}$; $\frac{9-x^2}{9}$

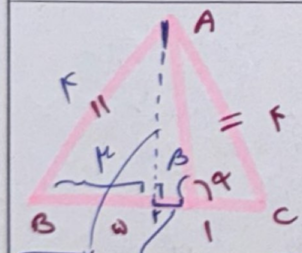
$\frac{6x}{9-x^2}=\frac{2}{x}$

$3x^2=9-x^2\Rightarrow4x^2=9$

$x^2=\frac{9}{4}\Rightarrow x=\pm\frac{3}{2}\to x=\frac{3}{2}$

$\cot\alpha=\frac{\frac{3}{1}}{\frac{3}{2}}=\frac{6}{3}=2$

۴



$\tan\alpha=?$

$\sqrt{4^2-3^2}=\sqrt{7}$

$\tan\beta=\frac{\sqrt{7}}{2}\Rightarrow$

$\alpha=\pi-\beta$

$\underbrace{\tan(\pi-\beta)}_{\tan\alpha}=-\tan\beta\Rightarrow\tan\alpha=-\frac{\sqrt{7}}{2}$

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$2\sin^2x+\cos^2x=\frac{4}{3}\to\tan^2x=?$

$\sin^2x+\underbrace{\sin^2x+\cos^2x}_{1}=\frac{4}{3}\Rightarrow\sin^2x=\frac{4}{3}-1\Rightarrow\sin^2x=\frac{1}{3}$

$1+\cot^2x=\frac{1}{\sin^2x}\Rightarrow\cot^2x=3-1=2\Rightarrow\tan^2x=\frac{1}{2}$

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۶

$$\frac{\sin^4\alpha + 4\cos^2\alpha}{1+\cos^2\alpha} - \frac{\cos^4\alpha + 4\sin^2\alpha}{1+\sin^2\alpha} = \frac{(1-\cos^2\alpha)^2 + 4\cos^2\alpha}{1+\cos^2\alpha} - \frac{(1-\sin^2\alpha)^2 + 4\sin^2\alpha}{1+\sin^2\alpha}$$

$$\frac{(1-\cos^2\alpha)^2}{1+\cos^2\alpha} \quad \frac{(1-\sin^2\alpha)^2}{1+\sin^2\alpha}$$

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

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

$$\frac{(1+\cos^2\alpha)^2}{1+\cos^2\alpha} - \frac{(1+\sin^2\alpha)^2}{1+\sin^2\alpha}$$

$$\cos^2\alpha - \sin^2\alpha = \boxed{\cos 2\alpha}$$

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$$\tan\alpha = \frac{4}{3} \qquad \alpha \to$$

$$\cos\alpha = -\frac{3}{5}, \quad \sin\alpha = -\frac{4}{5}$$

$$\cot\alpha = +\frac{3}{4}$$

$$\sin\left(\frac{9\pi}{2}+\alpha\right)\cos\left(\frac{7\pi}{2}-\alpha\right) - \tan\left(\alpha-\frac{3\pi}{2}\right)$$

$$\sin\left(\frac{\pi}{2}+\alpha\right)\cos\left(\frac{3\pi}{2}-\alpha\right) - \tan\left(\alpha-\frac{3\pi}{2}\right)$$

$$\cos\alpha \times -\sin\alpha + \cot\alpha$$

$$\frac{-3}{5}\times -\left(-\frac{4}{5}\right) + \frac{3}{4} = \frac{-12}{20} + \frac{3}{4} = \frac{-48+35}{100} = \frac{-13}{100}$$

۸

$$\left(4\cos 4x + \sqrt{2}\sin x - \sqrt{2}\cos x\right) \quad \text{if } x = \frac{\pi}{12}$$

$$4\cos\left(\frac{\pi}{3}\right) + \sqrt{2}\sin\left(\frac{\pi}{12}\right) - \sqrt{2}\cos\left(\frac{\pi}{12}\right) = 4\cos\left(\frac{\pi}{3}\right) + \sqrt{2}\times\sqrt{2}\sin\left(-\frac{\pi}{4}\right)$$

$$\sqrt{2}\left(\sin\frac{\pi}{12} - \cos\frac{\pi}{12}\right) \qquad 4\times\frac{1}{2} + 2\times -\frac{1}{2} = \frac{4}{2} - 1 = \frac{1}{2}$$

$$\sqrt{2}\sin\left(x-\frac{\pi}{4}\right) \to \sqrt{2}\sin\left(\frac{\pi}{12}-\frac{\pi}{4}\right)$$

$$-\frac{\pi}{6}$$

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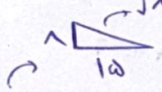
$$\tan\left(\frac{\alpha}{2}\right) = \frac{1}{4} \qquad \frac{\tan\alpha - \sin\alpha}{\sin\alpha - \cos\alpha} =$$



$$\sin\alpha = \frac{8}{17}, \quad \cos\alpha = \frac{15}{17}$$

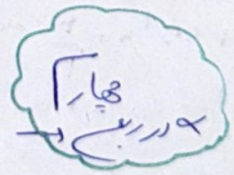
$$\tan\alpha = \frac{2\tan\left(\frac{\alpha}{2}\right)}{1-\tan^2\left(\frac{\alpha}{2}\right)} \Rightarrow \tan\alpha = \frac{2\times\frac{1}{4}}{1-\frac{1}{16}} = \frac{\frac{1}{2}}{\frac{15}{16}} = \frac{8}{15}$$

$$\frac{\frac{8}{15} - \frac{8}{17}}{\frac{8}{17} - \frac{15}{17}} = \frac{\frac{8(17-15)}{15\times 17}}{\frac{-7}{17}} = \frac{-16}{105}$$

۱۰

$2\sin\alpha < \sin 2\alpha \;,\; 0 < \dfrac{\cot\alpha}{\sin\alpha}$ ① — زاویه α در ربع ... است.

$$\frac{\frac{\cos\alpha}{\sin\alpha}}{\sin\alpha} > 0 \Rightarrow \frac{\cos\alpha}{\sin^2\alpha} > 0 \Rightarrow \boxed{\cos\alpha > 0} \to 0 < \cos\alpha < 1$$



$2\sin\alpha < 2\sin\alpha\cos\alpha$ ②

اگر $\sin\alpha > 0$ باشد

چون در ربع ... این عبارت درست نیست، پس

ذا هدشته من ذاهیم داشت $2\sin\alpha > 2\sin\alpha\cos\alpha$ درنتیجه $\sin\alpha$ باید منفی باشد

④ $\boxed{\sin\alpha < 0}$ ← تساوی نون درست باشد

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