نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ..... کلاس .....

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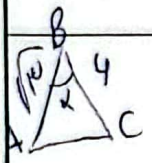

$S=\frac{1}{2}ab\sin\alpha \Rightarrow \frac{1}{2}ab\sin\alpha=6\sqrt{3} \Rightarrow ab\sin\alpha=12\sqrt{3}$

$\Rightarrow \sqrt{12}\times 9\times\sin\alpha=9 \Rightarrow \sin\alpha=\frac{\sqrt{3}}{2} \Rightarrow \alpha=60 \quad \alpha=120 \Rightarrow \frac{\alpha_{max}}{\alpha_{min}}=\frac{120}{60}=2$

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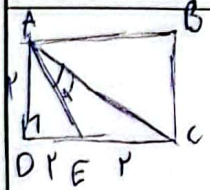

$S_{ACD}=\frac{AD\times DC}{2}=6 \qquad S_{AED}=\frac{AD\times DE}{2}=2$

مساحت مثلث‌هایی که با AC و AE تشکیل می‌شوند

$\Rightarrow \Delta S \Rightarrow S_{ACD}-S_{AED}=6-2=4 \Rightarrow \frac{1}{2}\times\sqrt{18}\times\sqrt{20}\times\sin\alpha=S_{ACE}=4$

$\Rightarrow \sin\alpha=\frac{1}{\sqrt{10}} \quad \cos\alpha=\frac{3}{\sqrt{10}} \Rightarrow \cot\alpha=\frac{\cos\alpha}{\sin\alpha}=\frac{\frac{3}{\sqrt{10}}}{\frac{1}{\sqrt{10}}}=3$

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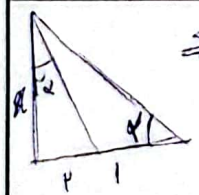

$\Rightarrow \tan^2\alpha=\frac{2}{x} \quad \tan\alpha=\frac{x}{2}$

$\Rightarrow \tan^2\alpha=\frac{2\tan\alpha}{1-\tan^2\alpha} \Rightarrow \frac{2(\frac{x}{2})}{1-(\frac{x}{2})^2} \Rightarrow \frac{x}{\frac{4-x^2}{4}}=\frac{2}{x} \Rightarrow \frac{4x}{4-x^2}=\frac{2}{x}$

$\Rightarrow 4x^2-8=4x^2 \Rightarrow 4x^2=12 \Rightarrow x=\frac{3}{2}$

$\Rightarrow \tan\alpha=\frac{\frac{3}{2}}{1}=\frac{3}{2} \Rightarrow \cot\alpha=2$

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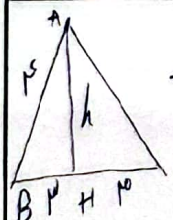
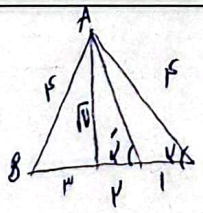


$\Rightarrow 5^2=3^2+h^2 \Rightarrow h=\sqrt{16}$



$\Rightarrow \tan\alpha'=\frac{\sqrt{15}}{3}$

$\Rightarrow \tan\alpha'=-\tan\alpha$

$\Rightarrow \tan\alpha=-\frac{\sqrt{15}}{3}$

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$3\sin^2\alpha+\cos^2\alpha=\frac{5}{3} \Rightarrow 3\tan^2\alpha+1=\frac{5}{3}(1+\tan^2\alpha)$

$\Rightarrow 9\tan^2\alpha+3=5\tan^2\alpha \Rightarrow 4\tan^2\alpha=1 \Rightarrow \tan^2\alpha=\frac{1}{4}$

$$\frac{\sin^4\alpha + 2\cos^2\alpha}{1+\cos^2\alpha} - \frac{\cos^4\alpha + 2\sin^2\alpha}{1+\sin^2\alpha} \Rightarrow \frac{\sin^4\alpha + 1 - \sin^2\alpha}{1+1-\sin^2\alpha} - \frac{\cos^4\alpha + 2(1-\cos^2\alpha)}{1+1-\cos^2\alpha}$$ ۳

$$\Rightarrow (2-\sin^2\alpha) - (2-\cos^2\alpha) = 2 - \sin^2\alpha - 2 + \cos^2\alpha$$ ۶

$$\Rightarrow \cos^2\alpha - \sin^2\alpha = \cos 2\alpha$$

$$\tan\alpha = \frac{3}{4} \Rightarrow 1+\tan^2\alpha = \frac{1}{\cos^2\alpha} \Rightarrow 1+\frac{9}{16} \Rightarrow \frac{1}{\cos^2\alpha} \Rightarrow \cos^2\alpha = \frac{16}{25} \Rightarrow \cos\alpha = -\frac{4}{5}$$

$$\Rightarrow \sin^2\alpha = 1-\cos^2\alpha \Rightarrow \sin^2\alpha = 1-\frac{16}{25} = \frac{9}{25} \Rightarrow \sin\alpha = -\frac{3}{5}$$

$$\Rightarrow \sin\left(\frac{9\pi}{2}+\alpha\right)\cos\left(\frac{11\pi}{2}-\alpha\right) - \tan\left(\alpha - \frac{3\pi}{2}\right)$$ ۷

$$\Rightarrow \cos\alpha \times -\sin\alpha + \cot\alpha \Rightarrow \left(-\frac{4}{5}\right)\left(\frac{3}{5}\right) + \frac{4}{3} \Rightarrow -\frac{12}{25} + \frac{4}{3} = \frac{64}{150}$$

$$\alpha = \frac{\pi}{12} \qquad 4\cos 5\alpha + \sqrt{2}\sin\alpha - \sqrt{2}\cos\alpha \Rightarrow 4\cos 5\alpha + \sqrt{2}(\sin\alpha - \cos\alpha)$$

$$\Rightarrow 4\cos 5\alpha + 2\sin\left(\alpha - \frac{\pi}{4}\right) \Rightarrow 4\cos 5\alpha + 2\sin\left(\alpha - \frac{\pi}{4}\right) \Rightarrow \alpha = \frac{\pi}{12}$$

$$\Rightarrow 4\cos\frac{\pi}{4} + 2\sin\left(-\frac{\pi}{4}\right) \Rightarrow 4\left(\frac{1}{2}\right) + 4\left(-\frac{1}{2}\right) \Rightarrow \frac{4}{2} - \frac{2}{2} = \frac{1}{2}$$ ۸

$$\tan\alpha = \frac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}} \Rightarrow \frac{2\times\frac{1}{3}}{1-\frac{1}{9}} \Rightarrow \frac{\frac{2}{3}}{\frac{8}{9}} \Rightarrow \frac{3}{4}$$

$$\sin\alpha = \frac{2\tan\frac{\alpha}{2}}{1+\tan^2\frac{\alpha}{2}} \Rightarrow \frac{2\times\frac{1}{3}}{1+\frac{1}{9}} \Rightarrow \frac{\frac{2}{3}}{\frac{10}{9}} \Rightarrow \frac{6}{10}$$

$$\Rightarrow \cos\alpha = \frac{\sin\alpha}{\tan\alpha} = \frac{\frac{6}{10}}{\frac{3}{4}} = \frac{24}{30}$$ ۹

$$2\sin\alpha < \sin^2\alpha \Rightarrow 2\sin\alpha < 2\sin\alpha\cos\alpha \Rightarrow 2\sin\alpha < \sin\alpha\cos\alpha$$

$$\Rightarrow \sin\alpha - \sin\alpha\cos\alpha < 0 \Rightarrow \sin\alpha(1-\cos\alpha) < 0 \Rightarrow \sin\alpha < 0$$

$$\Rightarrow \frac{\cot\alpha}{\sin\alpha} > 0 \Rightarrow \sin\alpha < 0 \Rightarrow \cot\alpha < 0 \Rightarrow \cos\alpha > 0$$ ۱۰

پاسخ ۱۱ را بعد دوم قرار دارد