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

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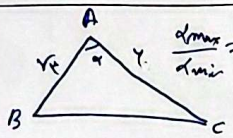

$S_{ABC}=\frac{1}{2}\times 24\times 20\times \sin\alpha = 80$ $\quad \sin\alpha=\frac{80}{240}=\frac{\sqrt{3}}{2}$

$\alpha \begin{cases} 60^\circ \\ 120^\circ \end{cases}$ $\quad \frac{\alpha_{max}}{\alpha_{min}}=\frac{120}{60}=2$

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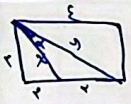

قضیه فیثاغورس $x=2^2+2^2=8\sqrt{2}$ $\quad S=\frac{1}{2}\times\sin\alpha\times 8\sqrt{2}\times 2\sqrt{2}=8\times\frac{1}{2}\times 2$

$\hookrightarrow 4^2+2^2=20=y$ $\quad \sin\alpha=\frac{2}{2\sqrt{10}}=\frac{1}{\sqrt{10}}$

$\sin^2\alpha+\cos^2\alpha=1 \rightarrow \frac{1}{10}+\cos^2\alpha=1$ $\quad \cos^2\alpha=\frac{9}{10}$ $\quad \cos\alpha=\frac{3}{\sqrt{10}}$

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

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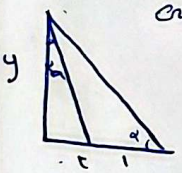

$\cot\alpha=\frac{3}{y}$ $\quad \cot^2\alpha=\frac{\cot^2\alpha-1}{2\cot\alpha}=\frac{(\frac{3}{y})^2-1}{2\times\frac{3}{y}}=\frac{y}{6}$

$9-y^2=3y^2 \Rightarrow y=3\sqrt{2}$

$\cot\alpha=3\times\frac{\sqrt{2}}{3}=\sqrt{2}$

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$\varepsilon^2-3^2=x^2$ $\quad x=\sqrt{7}$ $\quad y=\sqrt{7}^2+2^2=\sqrt{11}$

$S=\frac{1}{2}\times\sqrt{11}\times 1\times\sin\alpha=\frac{\sqrt{7}}{2}$ $\quad \sin\alpha=\frac{\sqrt{7}}{\sqrt{11}}$ $\quad \sin^2\alpha+\cos^2\alpha=1$

$\frac{7}{11}+\cos^2\alpha=1$ $\quad \cos^2\alpha=\frac{4}{11}$ $\quad \cos\alpha=\frac{2}{\sqrt{11}}$

$\tan\alpha=\frac{\sin\alpha}{\cos\alpha}=\frac{\frac{\sqrt{7}}{\sqrt{11}}}{\frac{2}{\sqrt{11}}}=\frac{\sqrt{7}}{2}$

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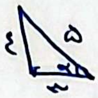
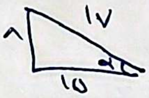
$\sin^2 x+\sin^2 x\cos^2 x=\frac{4}{3}$

$\sin^2 x=\frac{1}{3}$ $\quad \frac{1}{3}+\cos^2 x=\frac{4}{3}$ $\quad \cos^2 x=\frac{2}{3}$ $\quad \tan^2 x=\frac{\sin^2 x}{\cos^2 x}=\frac{1/3}{2/3}=\frac{1}{2}$

$\frac{\sin^4\alpha + 4\cos^2\alpha}{1+\cos^2\alpha} - \frac{\cos^4\alpha + 4\sin^2\alpha}{1+\sin^2\alpha} \Rightarrow 2 - \sin^2\alpha - 2 + \cos^2\alpha = \cos^2\alpha$	۶
$+(\cos\alpha)(-\sin\alpha) - (-\cot\alpha)$  $-\frac{3}{5} \times -\frac{4}{5} + \frac{3}{4}$ $\hookrightarrow \frac{12}{5} + \frac{3}{4} = \frac{63}{20}$]	۷
$3\cos\frac{\pi}{3} + \sqrt{2}\sin\frac{17\pi}{12} - \sqrt{2}\cos\frac{\pi}{12} \to \frac{3}{2} + \sqrt{2}(\sin 15 - \cos 15)$ $\sin 15 \to \sin(45-30) = \sin 45\cos 30 - \sin 30\cos 45 = \frac{\sqrt6}{4} - \frac{\sqrt2}{4} = \frac{\sqrt6-\sqrt2}{4}$ $\cos 15 \to \cos(45-30) = \sin 45 \sin 30 - \cos 45 \cos 30 = \frac{\sqrt2+\sqrt6}{4}$ $\frac{3}{2} + \sqrt2\left(\frac{\sqrt6-\sqrt2-\sqrt2-\sqrt6}{4}\right) = \frac{3}{2} + \sqrt2\left(\frac{-2\sqrt2}{4}\right) \Rightarrow \frac{3}{2} - \frac{2}{2} = \frac{1}{2}$]	۸
$\tan 2\alpha = \frac{2\tan\alpha}{1-\tan^2\alpha} \to \tan\alpha = \frac{2\tan\frac{\alpha}{2}}{1-\tan^2\frac{\alpha}{2}} = \frac{\frac{1}{2}}{\frac{15}{16}} = \frac{8}{15}$  $\cos\alpha = \frac{15}{17}$ $\sin\alpha = \frac{8}{17}$ $\frac{\frac{8}{15} - \frac{8}{17}}{\frac{8}{17} - \frac{15}{17}} = \frac{\frac{136-120}{255}}{\frac{7}{17}} = \frac{16}{105}$]	۹
$2\sin\alpha < 2\sin\alpha\cos\alpha \to$ $\sin\alpha < 0 \to \cos < 1$ ✓ $\sin\alpha > 0 \to \cos\alpha > 1$ ✗ $0 < \frac{\cot\alpha}{\sin\alpha}$ $0 < \cot\alpha$ و $\sin\alpha$ ربع اول $0 > \cot\alpha$ و $\sin\alpha$ ربع چهارم ✓ $\frac{\cos\alpha}{\sin\alpha} < 0$ $\cos\alpha > 0$ ناحیه ۴	۱۰