نام و نام خانوادگی ......امیرمحمد مجتبائی........ پاسخنامه تشریحی تکلیف شماره ...۲۷.... کلاس یازدهم [illegible] B......

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$S_{ABC}=\frac{1}{2}ab\sin\alpha \xrightarrow[b=6,\ S=4.5]{a=\sqrt{3}} \frac{1}{2}\times 6\times\sqrt{3}\times\sin\alpha=4.5$

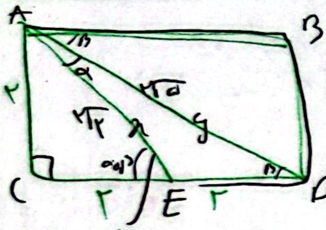
$S_{ABC}=4.5$

$\sin\alpha=\frac{9}{6\sqrt{3}} = \sin\alpha=\frac{\sqrt{3}}{2}$

$\sin\alpha=\frac{\sqrt{3}}{2}$ → $\alpha_1=\frac{\pi}{3}=60^\circ$, $\alpha_2=\frac{2\pi}{3}=120^\circ$

$\frac{\alpha_2}{\alpha_1}=\frac{\frac{2\pi}{3}}{\frac{\pi}{3}}=\boxed{2}$

۲



$y^2=4+16$

$y^2=20 \quad \boxed{y=2\sqrt{5}}$

$2^2+2^2=x^2$

$8=x^2 \Rightarrow \boxed{x=2\sqrt{2}}$

$S_{AED}=\frac{2\sqrt{5}\times 2\sqrt{2}}{2}\times\sin\alpha=2=2\sqrt{10}\times\sin\alpha=2$

$S_{AED}=\frac{2\times 2}{2}=2$

$\Rightarrow \sin\alpha=\frac{2}{2\sqrt{10}}=\frac{\sqrt{10}}{10} \qquad \cos\alpha=\frac{\sqrt{90}}{10}$

$z^2+10=100$

$z=\sqrt{90}$

$\cot\alpha=\frac{\frac{\sqrt{90}}{10}}{\frac{\sqrt{10}}{10}}=\sqrt{9}=3$

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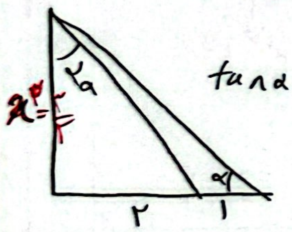
$\tan 2\alpha=\frac{2\tan\alpha}{1-\tan^2\alpha} \qquad \tan 2\alpha=\frac{2}{x}$



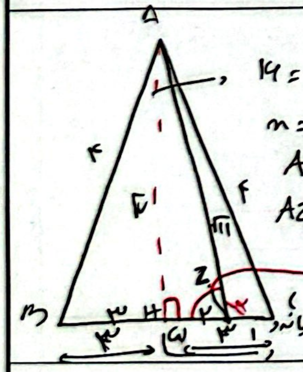
$\tan\alpha=\frac{x}{3} \Rightarrow \frac{2}{x}=\frac{\frac{2x}{3}}{1-\frac{x^2}{9}} \Rightarrow \frac{2x^2}{3}=\frac{2(9-x^2)}{9}$

$6x^2=18-2x^2$

$8x^2=18 \Rightarrow x^2=\frac{9}{4} \quad x=\frac{3}{2}$

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

۴



$16=9+x^2$

$x=\sqrt{7}$

$AH=\sqrt{7}$

$AZ \Rightarrow 7+4=x^2$

$x^2=11 \quad x=\sqrt{11} \quad AZ=\sqrt{11}$

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

در مثلث متساوی الساقین ارتفاع میانه هم هست.

$\tan\alpha \Rightarrow \tan(\pi-\alpha)=-\tan(\alpha)$

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

$\frac{\sqrt{7}}{2}=-\tan(\alpha) \Rightarrow \boxed{\tan\alpha=\frac{-\sqrt{7}}{2}}$

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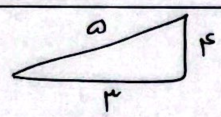
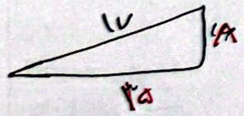
$2\sin^2x+\cos^2x=\frac{4}{3} \to \sin^2x+\underbrace{\sin^2x+\cos^2x}_{1}=\frac{4}{3} \to \sin^2x=\frac{1}{3}$

$\cos^2x+\sin^2x=1 \to \cos^2x+\frac{1}{3}=1 \Rightarrow \cos^2x=\frac{2}{3}$

$\tan^2x=\frac{\sin^2x}{\cos^2x}=\frac{\frac{1}{3}}{\frac{2}{3}}=\boxed{\frac{1}{2}}$

$\sin^2 x+\cos^2 x=1 \qquad =1-\sin^2 x$ $\cdot=1-\cos^2 x$ $\frac{\sin^4\alpha+4\cos^2\alpha}{1+\cos^2\alpha}-\frac{\cos^4\alpha+4\sin^2\alpha}{1+\sin^2\alpha}=\frac{(\sin^2x)^2+4\cos^2x}{1+\cos^2x}-\frac{(\cos^2x)^2+4\sin^2x}{1+\sin^2x}$ $\frac{(1-\cos^2x)^2+4\cos^2x}{1+\cos^2x}-\frac{(1-\sin^2x)^2+4\sin^2x}{1+\sin^2x}=\frac{1+\cos^4x-2\cos^2x+4\cos^2x}{1+\cos^2x}-\frac{1+\sin^4x-2\sin^2x+4\sin^2x}{1+\sin^2x}$ $\frac{(1+\cos^2x)^2}{1+\cos^2x}-\frac{(1+\sin^2x)^2}{1+\sin^2x}=1+\cos^2x-1-\sin^2x=\cos^2x-\sin^2x=\cos2\alpha$	۶
$\tan\alpha=\frac{4}{3}$ $\quad\alpha$ (ربع سوم)  $(4)^2+(3)^2=25$ $x=5$ $\sin\alpha=-\frac{4}{5}$ $\cos\alpha=-\frac{3}{5}$ $\sin(\frac{9\pi}{2}+\alpha)\cos(\frac{7\pi}{2}-\alpha)-\tan(\alpha-\frac{3\pi}{2})=-\cos\alpha\sin\alpha+\cot\alpha=-(-\frac{3}{5}\cdot-\frac{4}{5})+\frac{3}{4}=$ $-\frac{12}{25}+\frac{3}{4}=\frac{-48+75}{100}=\frac{27}{100}=\boxed{0.27}$	۷
$3\cos4x+\sqrt{2}\sin x-\sqrt{2}\cos x) \xrightarrow{x=\frac{\pi}{12}} 3\cos\frac{\pi}{3}+\sqrt{2}(\sin x-\cos x)$ $\frac{3}{2}+\sqrt{2}(\sqrt{2}\sin(\frac{\pi}{12}-\frac{\pi}{4})=\frac{3}{2}+2(\sin(-\frac{\pi}{6})=\frac{3}{2}+2(-\overset{\frac{1}{2}}{\sin(\frac{\pi}{6})})$ $\frac{3}{2}+(-1)=\boxed{\frac{1}{2}}$	۸
$\tan\alpha=\frac{2\tan(\frac{\alpha}{2})}{1-\tan^2\frac{\alpha}{2}}=\frac{2\times\frac{1}{4}}{1-\frac{1}{16}}=\frac{\frac{1}{2}}{\frac{15}{16}}=\frac{16}{30}=\frac{8}{15}$ اگر $\frac{\alpha}{2}$ ربع اول باشد α هم ربع اول است و اگر $\frac{\alpha}{2}$ ربع دوم باشد α هم ربع دوم است.  $(8)^2+(15)^2=64+225=289 \Rightarrow \sin\alpha=\frac{8}{17}$ $\sqrt{289}=17 \Rightarrow \cos\alpha=\frac{15}{17}$ $\frac{\tan\alpha-\sin\alpha}{\sin\alpha-\cos\alpha}=\frac{\frac{8}{15}-\frac{8}{17}}{\frac{8}{17}-\frac{15}{17}}=\frac{\frac{17\times8-15\times8}{15\times17}}{\frac{-7}{17}}=\frac{17(17\times8-15\times8)}{-7(15\times17)}=\boxed{\frac{-16}{105}}$	۹
$2\sin\alpha<2\sin\alpha\cos\alpha$ $\sin\alpha-\sin\alpha\cos\alpha<0$ $\sin\alpha(\underbrace{1-\cos\alpha}_{\text{مثبت}})<0\Rightarrow\sin\alpha<0$ $0\leq\ldots\leq2$ مثبت $\frac{\cot\alpha}{\sin\alpha}=\frac{\frac{\cos\alpha}{\sin\alpha}}{\sin\alpha}=\frac{\cos\alpha}{\underbrace{\sin^2\alpha}_{\text{مثبت}}}>0\Rightarrow\cos\alpha>0$ $\Big\}\Rightarrow$ ربع چهارم	۱۰