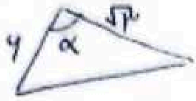
نام و نام خانوادگی: محسن جلالی ... پاسخنامه تشریحی تکلیف شماره ۲۷ کلاس یازدهم ریاضی B

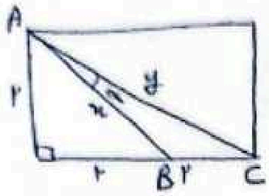


$S = \frac{1}{2} \times 6 \times \sqrt{3} \times \sin\alpha = 4.5$

$\sin\alpha = \frac{4.5}{3\sqrt{3}} = \frac{\frac{9}{2}}{3\sqrt{3}} = \frac{3}{2\sqrt{3}} = \frac{\sqrt{3}}{2} \longrightarrow \alpha = 60^\circ$

$\longrightarrow \alpha = 120^\circ$

$\frac{120}{60} = 2$ ۱



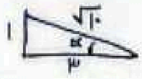
$x = \sqrt{2^2 + 2^2} = 2\sqrt{2}$

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

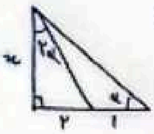
$\overset{\triangle}{ABC}: \; BC = \sqrt{x^2 + y^2 - 2xy\cos\alpha}$ ۲

$4 = 8 + 20 - 8\sqrt{10}\cos\alpha$

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



$\boxed{\cot\alpha = 3}$



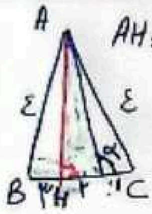
$\cot\alpha = ?$

$\cot\alpha = \frac{3}{x} \longrightarrow \tan\alpha = \frac{x}{3}$ $\qquad \tan 2\alpha = \frac{2\tan\alpha}{1 - \tan^2\alpha}$

$\tan 2\alpha = \frac{2}{x}$ ۳

$\frac{2}{x} = \frac{\frac{2x}{3}}{1 - \frac{x^2}{9}}$

$2 - \frac{2x^2}{9} = \frac{2x^2}{3} \qquad \frac{8x^2}{9} = 2 \qquad x^2 = \frac{9}{4} \qquad \boxed{x = \frac{3}{2}} \qquad \cot\alpha = \frac{3}{x} = \frac{3}{\frac{3}{2}} = 2$



$AH = \sqrt{16 - 9} = \sqrt{7}$

$\tan(\pi - \alpha) = \frac{\sqrt{7}}{2}$ ۴

$-\tan\alpha = \frac{\sqrt{7}}{2} \Longrightarrow \tan\alpha = -\frac{\sqrt{7}}{2}$

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

$\cos^2 x = \frac{2}{3}$

$1 + \tan^2 x = \frac{1}{\cos^2 x}$ ۵

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

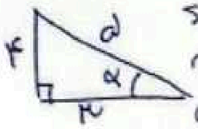
$$\frac{\sin^4\alpha+4\cos^2\alpha}{1+\cos^2\alpha}-\frac{\cos^4\alpha+4\sin^2\alpha}{1+\sin^2\alpha}=$$

$$\sin^4\alpha=(\sin^2\alpha)^2=(1-\cos^2\alpha)^2=1+\cos^4\alpha-2\cos^2\alpha$$ همینطور: $\cos^4$ ۶

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

$$\cos^2\alpha+\cancel{1}-\sin^2\alpha-\cancel{1}=\cos^2\alpha-\sin^2\alpha=\boxed{\cos2\alpha}$$

$$\sin(\underbrace{\frac{9\pi}{2}}_{\frac{\pi}{2}}+\alpha)\cos(\underbrace{\frac{7\pi}{2}}_{\frac{3\pi}{2}}-\alpha)-\tan(\alpha-\frac{3\pi}{2})=$$



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

$$\cos\alpha\times(-\sin\alpha)+\cot\alpha=$$ ۷

$$-\frac{3}{5}\times\frac{4}{5}=-\frac{12}{5}\qquad -\frac{12}{5\times4}+\frac{3}{4}=\frac{-48+15}{20}=-\frac{33}{20}$$

$$\sin^2\frac{\pi}{12}=\frac{1-\cos\frac{\pi}{6}}{2}=\frac{1-\frac{\sqrt3}{2}}{2}\longrightarrow\sin\frac{\pi}{12}=\frac{\sqrt{2-\sqrt3}}{2}$$

$$\cos^2\frac{\pi}{12}=\frac{1+\cos\frac{\pi}{6}}{2}=\frac{1+\frac{\sqrt3}{2}}{2}\longrightarrow\cos\frac{\pi}{12}=\frac{\sqrt{2+\sqrt3}}{2}$$ ۸

$$3\cos\frac{\pi}{3}+\sqrt2\left(\frac{\sqrt{2-\sqrt3}}{2}\right)-\sqrt2\left(\frac{\sqrt{2+\sqrt3}}{2}\right)=\frac{3}{2}+\frac{\sqrt{\overbrace{4-2\sqrt3}^{(1-\sqrt3)^2}}}{2}-\frac{\sqrt{\overbrace{4+2\sqrt3}^{(1+\sqrt3)^2}}}{2}=\frac{3+\sqrt3-1-\sqrt3-1}{2}$$

$$\boxed{\frac{1}{2}}$$

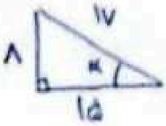
$$\tan^2\left(\frac{\alpha}{2}\right)=\frac{1-\cos\alpha}{1+\cos\alpha}\longrightarrow\frac{1}{16}=\frac{1-\cos\alpha}{1+\cos\alpha}\qquad 16-16\cos\alpha=1+\cos\alpha$$

$$17\cos\alpha=15$$

$\cos\alpha=\frac{15}{17}$

$\sin\alpha=\frac{8}{17}$

$\tan\alpha=\frac{8}{15}$



$$\frac{\tan\alpha-\sin\alpha}{\sin\alpha-\cos\alpha}=\frac{\frac{8}{15}-\frac{8}{17}}{\frac{8}{17}-\frac{15}{17}}=\frac{\frac{16}{\cancel{255}\,15}}{\frac{-7}{\cancel{17}}}=\boxed{-\frac{16}{105}}$$ ۹

$$2\sin\alpha<\sin2\alpha$$

$$\cancel{2\sin\alpha}<\cancel{2\sin\alpha}\cos\alpha$$

$\cos\alpha>1$ غیرممکن

$\cos\alpha<1$ ✓ ← پس $2\sin\alpha<0$ و تساوی برقرار نگردد

(I) $\sin\alpha<0$ $\qquad\frac{\cos\alpha}{\sin\alpha}>0\longrightarrow$ (II) $\cot\alpha<0$ ۱۰

(I), II $\Rightarrow$ ناحیه چهارم