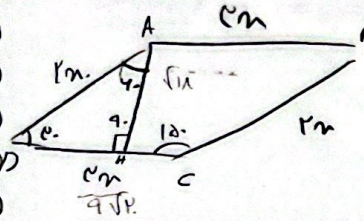
دریا دیانی دردستی

(۱)



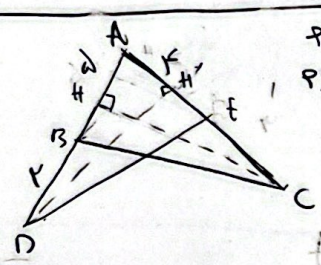
$AH \times 8 = 24$

$AH \times 9 = 18 \rightarrow x^2 = 18 \rightarrow x = 3\sqrt{2}$

$\sin 30 = \frac{AH}{2x} = \frac{1}{2} \Rightarrow AH = x$

$\frac{1}{2}P = 4x + 6x = 10x = \boxed{30\sqrt{2}}$

(۲)



$S_{ABC} - S_{ADE} = 1.75$

$S = \frac{1}{2}ab\sin\alpha \rightarrow \frac{1}{2} \times 10 \times 7 \times \sin A - \frac{1}{2} \times 7 \times 4 \times \sin A = 1.75$

$\frac{35}{2}\sin A - 14\sin A = 1.75 \rightarrow \frac{7}{2}\sin A = \frac{7}{4}$

$\sin A = \frac{\frac{7}{4}}{\frac{7}{2}} = \frac{1}{2} \rightarrow$ مثلث ۳۰ و ۶۰ $\rightarrow \tan = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \boxed{\frac{\sqrt{3}}{3}}$

(۳)

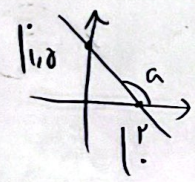
$\frac{1}{\sqrt{\cos^2 a}} - \tan a = \frac{1+\sin a}{|\cos a|}$ $\qquad \frac{|\sin a|}{\cos a} = -\frac{1}{\cot a}$

$\frac{1}{|\cos a|} - \frac{\sin}{\cos a} = \frac{1+\sin}{|\cos a|}$, $\frac{|\sin a|}{\cos a} = -\frac{1}{\cot} = -\frac{\sin a}{\cos a} \rightarrow -\sin$

$|\cos a| < 0$

a در ناحیه سوم است

(۴)

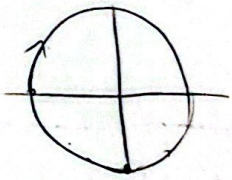


$\tan a = \frac{m}{n} \rightarrow \frac{-1.5}{2} = -0.75 = -\frac{3}{4}$

$\tan(\frac{\pi}{2} - \alpha) = \cot a = \boxed{-\frac{4}{3}}$

(۵)

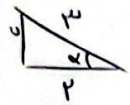
$\frac{3\cos(24\pi) - 2\sin(15\pi)}{\sin(20\pi) - \cos(24\pi)} = \frac{3\cos(\frac{5\pi}{2} - 2\pi) - 2\sin(\pi - 2\pi)}{\sin(\pi + 2\pi) - \cos(\frac{5\pi}{2} + 2\pi)} =$



$\frac{-3\sin 2\pi - 2\sin 2\pi}{-\sin 2\pi - \sin 2\pi} = \frac{-5\sin 2\pi}{-2\sin 2\pi} = \boxed{2.5}$

۶

$$\frac{\sin(\frac{\pi}{2}+\alpha)-\sin(\alpha-\pi)}{|1-\tan^2\alpha|}=\frac{\cos\alpha+\sin\alpha}{|1-\tan^2\alpha|}=\frac{\frac{2}{3}-\frac{\sqrt{5}}{3}}{|1-\frac{5}{9}|}=\frac{\frac{2-\sqrt{5}}{3}}{\frac{1}{3}}=\frac{2-\sqrt{5}}{2}$$



$\cos\alpha=\frac{2}{3}$

$\sin\alpha=-\frac{\sqrt{9-4}}{3}=-\frac{\sqrt{5}}{3}$

$\tan\alpha=\frac{-\frac{\sqrt{5}}{3}}{\frac{2}{3}}=-\frac{\sqrt{5}}{2}$

۷

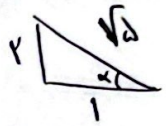
$\sin\alpha=2\cos\alpha \longrightarrow \frac{\sin\alpha}{\cos\alpha}=2=\tan\alpha$ $\quad 1+\tan^2\alpha=\frac{1}{\cos^2\alpha}=1+4=5=\frac{1}{\cos^2\alpha}$

$\sin\alpha<0$

$\cos\alpha<0$

$\cos^2\alpha=\frac{1}{5}$ در ربع سوم $\cos\alpha=-\frac{1}{\sqrt{5}}$

$\sin\alpha=\frac{-1}{\sqrt{5}}$



۸

$2mx+(m^2-1)y=3$

$\tan 45^\circ=\sqrt{3}$

$(m^2-1)y=3-2mx \rightarrow y=\frac{-2mx}{m^2-1}+\frac{3}{m^2-1}$

$\frac{-2m}{m^2-1}=\sqrt{3} \rightarrow \sqrt{3}m^2-\sqrt{3}=-2m \rightarrow \sqrt{3}m^2+2m-\sqrt{3}=0$

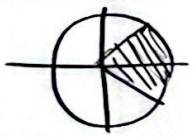
$\Delta=16 \rightarrow m=\frac{-2\pm 4}{2\sqrt{3}}$ $\quad m=-\frac{6}{2\sqrt{3}}=-\sqrt{3}$

$m=\frac{2}{2\sqrt{3}}=\frac{\sqrt{3}}{3}$

$|-\sqrt{3}-\frac{\sqrt{3}}{3}|=|\frac{-4\sqrt{3}}{3}|=\frac{4\sqrt{3}}{3}$

۹

$-\frac{\pi}{2}<\alpha<\frac{\pi}{2}$



$\tan(\frac{\pi}{4}-\alpha)=\frac{1-\alpha}{1+\alpha}$

$\tan(A\pm B)=\frac{\tan A\pm\tan B}{1\mp\tan A\tan B}$

$-\frac{\pi}{2}<\alpha<\frac{\pi}{2}$ $\quad -\frac{3\pi}{4}<\frac{\pi}{4}-\alpha<\frac{\pi}{4}$

$-\frac{\pi}{2}<\frac{\pi}{4}-\alpha<\frac{\pi}{4} \rightarrow 0<\frac{\pi}{2}-\alpha<\frac{\pi}{2}$

$0<\frac{1-\alpha}{1+\alpha}<+\infty \rightarrow \frac{1-\alpha}{1+\alpha}>0 \rightarrow \frac{-1}{-1}<\alpha<1$

$\alpha\in(-1,1)$

۱۰

$\tan(-300)\cos(210)+\tan(750)\sin(420)$

$\tan(-300)=-\tan(300)=-\tan(60)=-\sqrt{3}$

$\cos(210)=-\cos(30)=-\frac{\sqrt{3}}{2}$

$\tan(750)=\tan(30)=\frac{\sqrt{3}}{3}$

$\sin(420)=\sin(60)=\frac{\sqrt{3}}{2}$

$\frac{3}{2}+(-\frac{1}{2})=1$