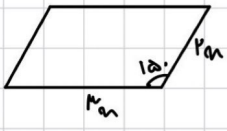
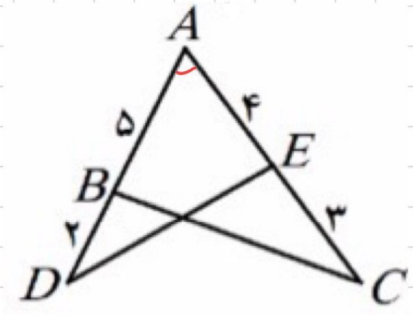
۱- 

$S=\frac{1}{2}ab\sin\alpha \Rightarrow \frac{1}{2}\cdot 3m\cdot 2m=6\sqrt{3} \Rightarrow 3m^2=6\sqrt{3} \Rightarrow m^2=2\sqrt{3} \Rightarrow m=\sqrt[4]{12}$

$P=2(4\sqrt{3}+9\sqrt{3})=26\sqrt{3}$

۲-



$\frac{7\times 5\times \sin A}{2}-\frac{7\times 4\times \sin A}{2}=1,75 \Rightarrow$

$\frac{7\sin A}{2}(5-4)=1,75 \Rightarrow 7\sin A=3,5 \Rightarrow \sin A=\frac{1}{2} \Rightarrow A=30^\circ$

$\tan 30^\circ=\frac{\sqrt{3}}{3}$

۳-

$\frac{1}{\sqrt{\cos^2\alpha}}-\tan\alpha=\frac{1+\sin\alpha}{|\cos\alpha|} \Rightarrow \frac{1}{|\cos\alpha|}-\tan\alpha=\frac{1}{|\cos\alpha|}+\frac{\sin\alpha}{|\cos\alpha|} \Rightarrow \frac{-\sin\alpha}{\cos\alpha}=\frac{\sin\alpha}{|\cos\alpha|} \Rightarrow$

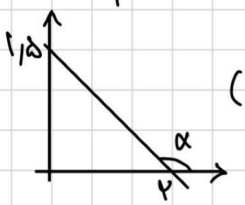
$\cos\alpha<0$

$\frac{|\sin\alpha|}{\cos\alpha}=-\frac{1}{\cot\alpha} \Rightarrow \frac{|\sin\alpha|}{\cos\alpha}=-\frac{\sin\alpha}{\cos\alpha} \Rightarrow \sin\alpha<0$

$\Rightarrow$ α در ناحیه سوم قرار دارد

۴-

$\tan\left(\frac{\pi}{2}-\alpha\right)=\cot\alpha$



$(2,0)-(0,1,5) \Rightarrow m=\frac{1,5-0}{0-2}=-\frac{3}{4}=\tan\alpha \Rightarrow \cot\alpha=-\frac{4}{3}$

۵-

$\alpha=22^\circ$

$\frac{3\cos\left(\frac{3\pi}{2}-\alpha\right)-2\sin(\pi-\alpha)}{\sin(\pi+\alpha)-\cos\left(\frac{3\pi}{2}+\alpha\right)}=\frac{-3\sin\alpha-2\sin\alpha}{-\sin\alpha-\sin\alpha}=\frac{-5\sin\alpha}{-2\sin\alpha}=\frac{5}{2}$

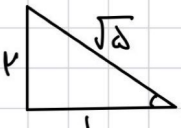
۶-

$\cos^2\alpha+\sin^2\alpha=1 \Rightarrow \sin^2\alpha=1-\frac{4}{9} \Rightarrow \sin\alpha=\pm\frac{\sqrt{5}}{3} \Rightarrow \tan\alpha=\frac{-\frac{\sqrt{5}}{3}}{\frac{2}{3}}=-\frac{\sqrt{5}}{2} \Rightarrow \tan^2\alpha=\frac{5}{4}$

$\frac{\sin\left(\frac{\pi}{2}+\alpha\right)-\sin(\alpha-\pi)}{|\tan^2\alpha-1|}=\frac{\cos\alpha-\sin\alpha}{\frac{5}{4}-1}=\frac{\frac{2-\sqrt{5}}{3}}{\frac{1}{4}}=\frac{8-4\sqrt{5}}{3}$

۷-

$\sin\alpha=2\cos\alpha \Rightarrow \tan\alpha=2$



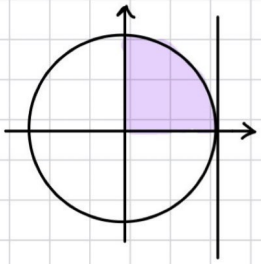
$\Rightarrow \cos\alpha=\frac{1}{\sqrt{5}} \xrightarrow{\text{ناحیه سوم}} -\frac{1}{\sqrt{5}}=-\frac{\sqrt{5}}{5}$

$2mx + (m^2-1)y = 2 \xrightarrow{\div m^2-1} y = \frac{-2mx}{m^2-1} + \frac{2}{m^2-1}$ $\quad \tan 60^\circ = \sqrt{3} \Rightarrow \frac{-2m}{m^2-1} = \sqrt{3}$ -۸

$\sqrt{3}m^2 - \sqrt{3} = -2m \Rightarrow \sqrt{3}m^2 + 2m - \sqrt{3} = 0 \xrightarrow{\text{ضرب}} m^2 + 2m - 3 = 0 \; a_1 = \frac{1}{\sqrt{3}}, \; a_2 \frac{3}{\sqrt{3}} \Rightarrow$

$a_1 - a_2 = \frac{1-(-3)}{\sqrt{3}} = \frac{4}{\sqrt{3}}$

-۹



$-\frac{\pi}{4} < x < \frac{\pi}{4} \xrightarrow{\times -} -\frac{\pi}{4} < -x < \frac{\pi}{4} \xrightarrow{+\frac{\pi}{4}} 0 < \frac{\pi}{4} - x < \frac{\pi}{2} \Rightarrow$

$\tan 0 < \tan\left(\frac{\pi}{4} - x\right) < \frac{\tan\frac{\pi}{2}}{\text{تعریف نشده}} \Rightarrow \frac{1-m}{2+m} > 0 \Rightarrow$

	-2		1	
$1-m$	$+$	$+$	0	$-$
$2+m$	$-$	0	$+$	$+$

$m \in (-2, 1)$

-۱۰

$\underbrace{\tan(120^\circ)}_{-\sqrt{3}} \underbrace{\cos(150^\circ)}_{-\frac{\sqrt{3}}{2}} + \underbrace{\tan(240^\circ)}_{\tan(270-30)} \underbrace{\sin(210^\circ)}_{\sin(180+30)} = \frac{3}{2} - \frac{3}{2} = 0$

$-\sqrt{3}$ $\quad$ $\tan(270-30)$ $\quad$ $\sin(180+30)$

$-\sqrt{3}$ $\quad$ $\cot 30$ $\quad$ $-\frac{1}{2}$

$\sqrt{3}$