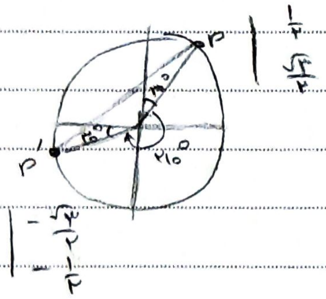
۱ـ

$$\frac{a\times(-\frac{\sqrt3}{2})+b\times(-\frac{\sqrt3}{2})}{a\times(-\frac12)+b\times\frac12}=-\frac{\sqrt3}{3}\Rightarrow\frac{-\frac{\sqrt3}{2}(a+b)}{-\frac12(a-b)}=-\frac{\sqrt3}{3}$$

$$\Rightarrow +\sqrt3\times\frac{a+b}{a-b}=-\frac{\sqrt3}{3}\Rightarrow\frac{a+b}{a-b}=\frac13\Rightarrow a-b=3a+3b\Rightarrow 2a=-4b\Rightarrow\frac{b}{a}=\frac{2}{-4}$$

$$\boxed{=-\frac12}$$

۲ـ



$$PP'=\sqrt{\left(\frac12-(-\frac{\sqrt3}{2})\right)^2+\left(\frac{\sqrt3}{2}-(-\frac12)\right)^2}$$

$$=\sqrt{\left(\frac{1+\sqrt3}{2}\right)^2+\left(\frac{1+\sqrt3}{2}\right)^2}=\sqrt{\frac{1+3+2\sqrt3+1+3+2\sqrt3}{4}}$$

$$=\sqrt{\frac{8+4\sqrt3}{4}}=\sqrt{2+\sqrt3}$$

$$P=1+1+\sqrt{2+\sqrt3}=\boxed{2+\sqrt{2+\sqrt3}}$$

۳ـ

$$\frac{D}{180}=\frac{\frac{\pi}{9}}{\pi}\Rightarrow\frac{D}{180}=\frac19\Rightarrow D=20^\circ\Rightarrow$$ نصف دقیقه   دقیقه $=2\times20=40'$

$$\Rightarrow\boxed{2:40'}$$

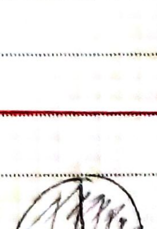
۴ـ بار دوم

$$\alpha=\left|\frac{11m}{2}-30H\right|\Rightarrow 20=\left|\frac{11m}{2}-3\times30\right|\Rightarrow\frac{11m}{2}=90+20\Rightarrow m=20$$

$$\Rightarrow\boxed{3:20'}$$

بار اول $\frac{11m}{2}=80-2\Rightarrow m=12,...$

۵ـ



$$-\frac12<\sin x\leq1\Rightarrow-\frac12<\frac{m-3}{5}\leq1\xrightarrow{\times5}-\frac52<m-3\leq5$$

$$0/5<m\leq8\Rightarrow$$ ۸ عدد صحیح (boxed)

۶

$$\frac{\sin(\frac{\pi}{2}+15^\circ)+k\cos(\frac{3\pi}{2}-15^\circ)}{\cos(\pi-15^\circ)+2\sin(\pi+15^\circ)}=\frac{\cos 15^\circ+k(-\sin 15^\circ)}{-\cos 15+2(-\sin 15)}$$

$$\xrightarrow{\div\cos}\frac{1+k(-\tan 15)}{-1+2(-\tan 15)}=\frac{1-0{,}25k}{-1-0{,}5}=3\rightarrow 1-0{,}25k=-3-1{,}5$$

$$0{,}25k=5{,}5\rightarrow \boxed{k=22}$$

۷

$$\frac{\cot x-(-\cot x)}{\tan x+2(-\tan x)}=\frac{2\cot x}{-\tan x}=\frac{2(-\frac{\sqrt{8}}{8})}{\sqrt{8}}=\frac{\frac{-2\sqrt{8}}{8}}{\sqrt{8}}=\frac{-2}{8}=\boxed{-\frac{1}{4}}$$

$1-\cos x=2+2\cos x\Rightarrow -1=3\cos x\Rightarrow \cos x=\frac{-1}{3}$

$\sin^2 x+\cos^2 x=1$

$\sin^2 x=1-\cos^2 x=1-\frac{1}{9}=\frac{8}{9}$

$\sin=\pm\frac{\sqrt{8}}{3}$ (ق ق)

$\cot x=\frac{-\frac{1}{3}}{\frac{\sqrt{8}}{3}}=-\frac{1}{\sqrt{8}}=-\frac{\sqrt{8}}{8}$

$\tan x=\frac{\frac{\sqrt{8}}{3}}{-\frac{1}{3}}=-\sqrt{8}$

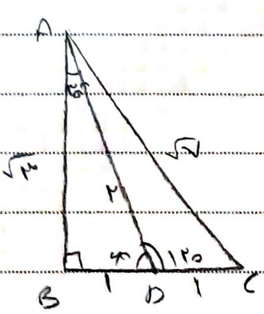
۸

$\frac{108}{180}=\frac{R}{\pi}\Rightarrow R=\frac{3\pi}{5}$

$r_A\times\frac{3\pi}{5}=r_B\times\frac{9\pi}{10}\rightarrow\frac{r_A}{r_B}=\frac{\frac{9\pi}{10}}{\frac{3\pi}{5}}=\frac{9\pi\times5}{3\pi\times10}=\frac{3}{2}$

$\frac{S_A}{S_B}=(\frac{3}{2})^2=\boxed{\frac{9}{4}}$

۹



ضلع روبرو به ۳۰° $=\frac{\text{وتر}}{2}=\frac{AD}{2}=1\Rightarrow AD=2$

$AB=\sqrt{2^2-1^2}=\sqrt{3}$

$\frac{1}{2}\times\sqrt{3}\times BC=\sqrt{3}\Rightarrow BC=2\Rightarrow DC=1$

$AC=\sqrt{(\sqrt{3})^2+2^2}=\sqrt{3+4}$

$\frac{a}{\sin A}=\frac{c}{\sin C}\rightarrow\frac{\sqrt{7}}{1}=\frac{\sqrt{3}}{\sin C}$

$\sin C\rightarrow\sqrt{\frac{3}{7}}$

$\sin 2C=2\sin\cos C=2\times\frac{\sqrt{3}}{\sqrt{7}}\times\frac{2\sqrt{7}}{7}=\boxed{\frac{4\sqrt{3}}{7}}$

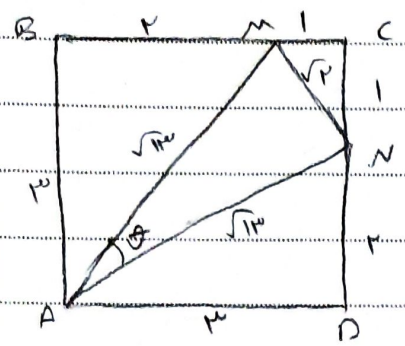
$\cos C=\frac{2}{\sqrt{7}}=\frac{2\sqrt{7}}{7}$

Arman

Subject:

Year: Month: Day:

page: ( )



$AM = AN = \sqrt{۳^۲ + ۲^۲} = \sqrt{۱۳}$

$\cos\theta = \frac{۱۳+۱۳-۲}{۲۶} = \frac{۲۴}{۲۶} = \frac{۱۲}{۱۳}$

$\sin^۲\theta = ۱ - \cos^۲\theta = ۱ - \frac{۱۴۴}{۱۶۹} = \frac{۲۵}{۱۶۹} \Rightarrow \sin\theta = \frac{۵}{۱۳}$