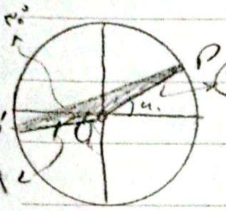
۱)
$$\frac{a\sin\frac{4\pi}{3}+b\cos\frac{7\pi}{6}}{a\sin\frac{11\pi}{6}+b\cos\frac{\pi}{3}}=\tan\frac{5\pi}{6}\qquad \frac{\frac{\sqrt{3}}{2}a-b\frac{\sqrt{3}}{2}}{-\frac{a}{2}+\frac{b}{2}}=-\frac{\sqrt{3}}{3}\xrightarrow{\text{صورت و مخرج} \times 2}\frac{\sqrt{3}a-b\sqrt{3}}{-a+b}=-\frac{\sqrt{3}}{3}$$

$$3\sqrt{3}a-3b\sqrt{3}=\sqrt{3}a-\sqrt{3}b$$

$$2\sqrt{3}a=2\sqrt{3}b\qquad \frac{b}{a}=\frac{2\sqrt{3}}{2\sqrt{3}}=1$$

۲)



$$\frac{210\pi}{180}=\frac{7\pi}{6}$$

$$P=\frac{\pi}{3}\to\left|\begin{matrix}\frac{1}{2}\cos\\ \frac{\sqrt{3}}{2}\sin\end{matrix}\right.\qquad P'\left|\begin{matrix}-\frac{\sqrt{3}}{2}\\ -\frac{1}{2}\end{matrix}\right.$$

$$\sqrt{\left(\frac{1}{2}+\frac{\sqrt{3}}{2}\right)^2+\left(\frac{\sqrt{3}}{2}+\frac{1}{2}\right)^2}=\sqrt{2\left(\frac{1+\sqrt{3}}{2}\right)^2}=\sqrt{2}\left|\frac{1+\sqrt{3}}{2}\right|=\frac{\sqrt{2}+\sqrt{6}}{2}+2$$

(۲ شعاع دایره (دو ضلع مثلث))

۳)
$$\frac{D}{180}=\frac{\frac{\pi}{9}}{\pi}\to\frac{D}{180}=\frac{1}{9}\to D=20\to 20^\circ$$

۴)
$$\frac{11}{2}M-\frac{30\cdot 6}{2}=20\to\frac{11}{2}M-90=20\to\frac{11}{2}M=110\quad M=\frac{220}{11}=20\ ✓$$

$$\frac{11}{2}M-90=-20\to\frac{11}{2}M=70\to M=\frac{140}{11}=12.7\ ×$$

۵)
$$-\frac{1}{2}<\frac{m-3}{5}\leq 1\to-\frac{5}{2}<m-3\leq 5\to\frac{1}{2}<m\leq 8$$

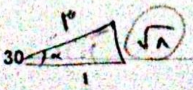
$$\sin-\frac{\pi}{6}=-\frac{1}{2}\ ,\ \sin\frac{5\pi}{2}=1$$

۶)
$$\frac{\sin 105+k\cos 255}{\cos 165+2\sin 195}=3\to\frac{\sin(90+15)+k\cos(270-15)}{\cos(180-15)+2\sin(180+15)}=\frac{\cos 15-k\sin 15}{-\cos 15-2\sin 15}$$

$$=\frac{1-k\tan 15}{-1-2\tan 15}=3\Rightarrow 1-k\tan 15=-3-6\tan 15\to -k\tan 15+6\tan 15=-3-1$$

$$(6-k)\underbrace{\tan 15}_{\frac{1}{4}}=-4\to 6-k=-16\quad k=22$$

۷)
$$\frac{1-\cos x}{1+\cos x}=2\to 1-\cos x=2+2\cos x\to 3\cos x=-1\quad \cos x=-\frac{1}{3}$$



$$\sin=\frac{\sqrt{8}}{3}$$

PAYCO

۴ ۳k ۴-۳k

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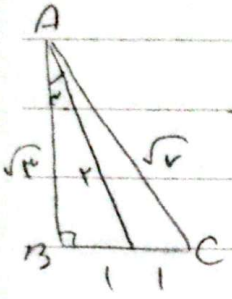
$$\frac{\tan\left(\frac{\pi}{2}-\alpha\right)-\cot(\pi-\alpha)}{\cot\left(\frac{5\pi}{2}-\alpha\right)+2\tan(5\pi-\alpha)} = \frac{\tan\alpha+\cot\alpha}{\tan\alpha-2\tan\alpha} = \frac{-\sqrt{8}-\frac{\sqrt{8}}{8}}{\sqrt{8}} = \frac{-\frac{9\sqrt{8}}{8}}{\frac{\sqrt{8}}{1}} = -\frac{9}{8}$$

$$\frac{D}{180} = \frac{R}{r} \rightarrow \frac{10\cancel{8}}{\cancel{180}_{\varepsilon}} = \frac{R}{r} \rightarrow R = \frac{5r}{\varepsilon}$$

(8

$$\frac{5r}{\varepsilon} \times r_A = \frac{9r}{10} \times r_B \rightarrow \frac{r_A}{r_B} = \frac{a\frac{9r}{10}}{\frac{5r}{2\varepsilon}} = \frac{9}{a} \rightarrow \frac{S_A}{S_B} = \frac{\pi r_a^2}{\pi r_B^2} = \frac{81}{16}$$

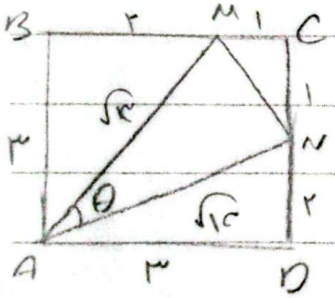


$$\frac{AB \times BC}{2} = \sqrt{2} \rightarrow BC = 2$$

(9

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

$$x^2 = \sqrt{2}^2 + 2^2 = \sqrt{6}$$



$$AN = \sqrt{4+9} = \sqrt{13}$$

$$MN = \sqrt{4+9} = \sqrt{13}$$

(10

$$S_{AON} = \frac{2\times 2}{2} = 2 \quad S_{BMA} = \frac{2\times 2}{2} = 2 \quad S_{MCN} = \frac{1\times 1}{2} = \frac{1}{2}$$

$$S_{AMN} = 9 - 4{,}5 = 2{,}5 \rightarrow S_{AMN} = \frac{1}{2}\sqrt{13}\times\sqrt{13}\times\sin\theta = 2{,}5 \cdot \frac{9}{2}$$

$$\sin\theta = \frac{9}{13}$$