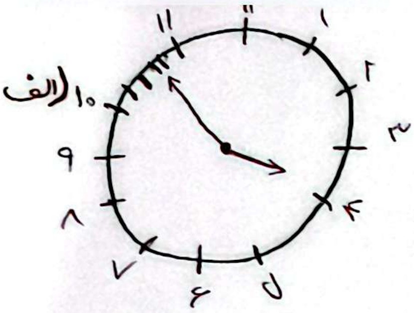
به نام خدا — مهدی مومنی

۲۰ عالی نوشتی!

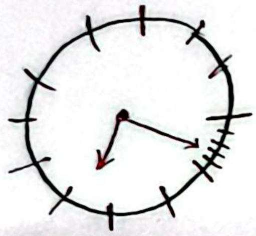


① (۲)

$a = 5.5M - 30h \to 5.5\times 54 - 30\times 3 = 207^\circ$

$360 - 207 = \boxed{153^\circ}$ ✓ → از فرمول

$4(30^\circ) + 6^\circ + \left(\frac{54^\circ}{2}\right) = 120^\circ + 6^\circ + 27^\circ = 153^\circ$ ✓ → با شکل



② با شکل: $2(30^\circ) + 2(6^\circ) + \left(\frac{18^\circ}{2}\right) = 60 + 12 + 9 = 81^\circ$ ✓

(۲) فرمول: $a = 5.5M - 30h \to \frac{55}{10}\times 18 - 30(6) = |99 - 180| = 81^\circ$ ✓

③ (۲)

الف) $\frac{\alpha}{2}R^2 \Rightarrow \frac{\frac{\pi}{6}}{2}\times 9 = \frac{\pi}{12}\times 9 = \frac{3\pi}{4}$ ✓

ب) $\frac{\pi}{6}\times 3 = \frac{\pi}{2}$ ؛ محیط $= 2R + L \to 2\times 3 + \frac{\pi}{2} = 6 + \frac{\pi}{2}$ ✓

④ (۲)

الف) $\frac{1}{2}\times 5\times 8\times \sin 60^\circ = 4\times 5\times \frac{\sqrt{3}}{2} = 10\sqrt{3}$ ✓ — قانون کسینوس ها

ب) $CB^2 = 64 + 25 - 2\left(40\times \frac{1}{2}\right) = CB^2 = 49 \to CB = 7 \to P = 7 + 8 + 5 = 20$ ✓

⑤ (۲)

$\hat{B} + \hat{C} + \hat{A} = 180 \xrightarrow{B+C=150} \hat{A} = 30^\circ$ — قانون Sin ها → $\frac{15}{\frac{1}{2}} = \frac{15\sqrt{2}}{\hat{B}} \to \hat{B} = \frac{\sqrt{2}}{2} = 45^\circ$

$\hat{C} = 180 - (30 + 45) = 105^\circ$

$\to B = \frac{45^\circ}{180} = \frac{Rad}{\pi} \to Rad = \frac{\pi}{4}$ ✓

$C = \frac{105}{180} = \frac{Rad}{\pi} \to Rad = \frac{7\pi}{12}$ ✓

⑥ (۲)

$\frac{\ldots(\pi - a) + 3\tan(\pi + a)}{\ldots(\pi - a) - \tan(2\pi + a)} = \frac{-\tan a + 3\tan a}{-\tan a - \tan a} = \frac{2\tan a}{-2\tan a} = -1$ ✓

⑦ (۲)

$\frac{\frac{\pi}{12}}{\frac{\pi}{\ldots}} = \frac{D}{180} \to D = 15^\circ$ و $\frac{2\tan(90 - 15) + \tan(90 + 15)}{3\tan(180 + 15) - \tan(270 - 15)} \to$

$\frac{\ldots + (-\cot 15)}{\ldots - (\cot 15)} = \frac{\cot 15^\circ}{-3\tan 15 - \cot 15} \longrightarrow \tan 15^\circ = a \to \cot 15^\circ = \frac{1}{a}$

$\frac{\frac{1}{a}}{-3a - \frac{1}{a}} = -\frac{1}{3a^2 + 1}$ ✓

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

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$$\rightarrow -\cos 2\alpha=\frac{2}{2}\rightarrow \cos 2\alpha=-\frac{2}{2}=\frac{1-\tan^2\alpha}{1+\tan^2\alpha} \Rightarrow -2-2\tan^2\alpha=2-2\tan^2\alpha$$

$$\rightarrow \boxed{0=\tan^2\alpha}$$

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

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$$\frac{2}{\cos^2\alpha}-2=4\rightarrow\frac{2}{\cos^2\alpha}=6\rightarrow\cos^2\alpha=\frac{2}{6}\rightarrow\frac{1}{\cos^2\alpha}=1+\tan^2\alpha\rightarrow\frac{6}{2}-1=\frac{\omega}{2}=\tan^2\alpha$$

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الف) $\cos(112.5^\circ)=\cos^2 112.5=\frac{1+\cos 225}{2}\Rightarrow\frac{1+\frac{\sqrt{2}}{2}}{2}=\frac{2+\sqrt{2}}{4}\xrightarrow{\sqrt{\ }}$

$$\cos 112.5^\circ=\frac{\sqrt{2+\sqrt{2}}}{2}$$

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ب) $\sin(67.5^\circ)=\sin^2=\frac{1-\cos 135^\circ}{2}=\frac{1+\frac{\sqrt{2}}{2}}{2}\rightarrow\frac{2+\sqrt{2}}{4}\xrightarrow{\sqrt{\ }}$

$$\sin 67.5=\frac{\sqrt{2+\sqrt{2}}}{2}$$

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