۱-

$$\frac{a\sin\frac{4\pi}{3}+b\cos\frac{7\pi}{6}}{a\sin\frac{7\pi}{6}+b\cos\frac{\pi}{3}}=\tan\frac{5\pi}{6}\to\frac{a\times-\frac{\sqrt3}{2}+b\times-\frac12}{a\times-\frac12+b\times\frac12}=-\frac{\sqrt3}{3}$$

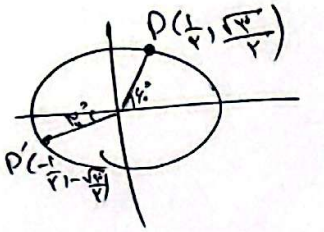
۱٫۲۵

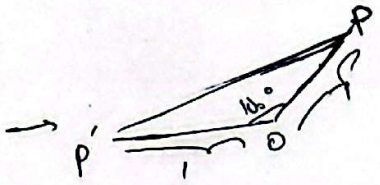
$$\to-\frac{3\sqrt3}{2}a-\frac32 b=\frac{\sqrt3}{2}a-\frac{\sqrt3}{2}b\to\left(\frac{3-\sqrt3}{2}\right)b=\left(-\frac{4\sqrt3}{2}\right)a\to\frac{b}{a}=\frac{-4\sqrt3}{3-\sqrt3}=-\frac{4}{\sqrt3-1}$$

$$\frac{-4}{\sqrt3-1}\times\frac{\sqrt3+1}{\sqrt3+1}=\frac{-4\sqrt3-4}{2}=-2\sqrt3-2$$

۱۸٫۵

۲-





$$PP'=\sqrt{1+1-2\cos150^\circ}=\sqrt{2+\sqrt3}$$

۲

محیط $2+\sqrt{2+\sqrt3}$

۳-

$\frac{\pi}{6}$	۱ ساعت
$\frac{\pi}{9}$	؟

$$\to\frac{\frac{\pi}{9}}{\frac{\pi}{6}}=\frac69=\frac23\text{ ساعت}=40\text{ دقیقه}\to2:00+0:40=2:40'$$

۲

۵-

$$-\frac{\pi}{6}<x\le\frac{5\pi}{6}\to-\frac12<\sin x\le1\to-\frac12<\frac{m-3}{5}\le1\to-\frac52<m-3\le5$$

۲

$$\to\frac12<m\le8\to\{1,2,3,\dots,8\}$$ ۸ عدد صحیح

سوال ۴ و ۵ جابجا شد

۴-

$$\alpha=\left|\frac{11m}{2}-30H\right|\xrightarrow[\alpha=20]{\text{برای بار دوم}}20=\frac{11m}{2}-90\to\frac{11m}{2}=110\to11m=2\times110\to m=20$$

۲

دقیقه ۲۰

۶-

$$\frac{\sin105+K\cos255}{\cos165+2\sin195}=3\to\frac{\cos15-K\sin15}{-\cos15-2\sin15}=3\to\frac{4-K}{-4-2}=3\to4-K=-18$$

$K=22$

۲

$\tan15=\frac14\to\sin15=1$

$\to\cos15=4$

فرض کردم! خواهم داشت $-1\le\cos\le1$

۷-

$$\frac{\tan(\frac{\pi}{2}-x)-\cot(\pi-x)}{\cot(\frac{3\pi}{2}-x)+2\tan(2\pi-x)}=\frac{\cot x+\cot x}{\tan x-2\tan x}=\frac{2\cot}{-\tan}=\frac{\frac{2\times\sqrt2}{2\times4}}{-2\sqrt2}=\frac{\sqrt2}{-4\sqrt2}=-\frac14$$

۲

$$\frac{1-\cos x}{1+\cos x}=2\to2+2\cos=1-\cos\to3\cos=-1\to\cos x=-\frac13$$

$$1+\tan^2=\frac{1}{\cos^2}\to1+\tan^2=9\to\tan^2=8\to\tan x=2\sqrt2\to\cot x=\frac{1}{2\sqrt2}=\frac{\sqrt2}{4}$$

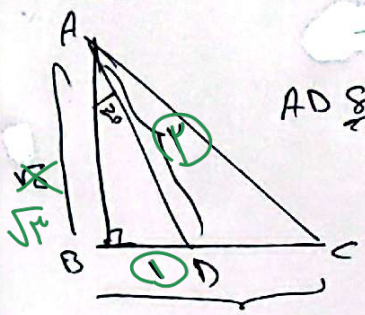
۸-

$$\left.\begin{array}{l} 108^\circ = \frac{6\pi}{10} = \frac{3\pi}{5} \\ l = r\theta \end{array}\right\} l_A = l_B \to \frac{2\pi}{5} \times r_A = \frac{9\pi}{10} \times r_B \to \frac{r_A}{r_B} = \frac{\frac{9\pi}{10}}{\frac{3\pi}{5}} = \frac{\cancel{9}^{3} \times \cancel{5} \times \cancel{\pi}}{\cancel{3} \times \cancel{10}_{2} \times \cancel{\pi}} = \boxed{\frac{3}{2}}$$

$$\frac{S_A}{S_B} = \left(\frac{r_A}{r_B}\right)^2 = \frac{9}{4}$$

۲

۹-



$$S_{ABC} = \frac{AB \times BC}{2} = \frac{\sqrt{5} \times BC}{2} = \sqrt{3}$$

$$BC = \frac{2\sqrt{3}}{\sqrt{5}}$$

$$AD \underbrace{\sin 30}_{\frac{1}{2}} = \cancel{BD}^{1} \to \boxed{AD = 2}$$

$$AB = \sqrt{2^2 + 1^2} = \sqrt{5}$$

$$\to AC^2 = AB^2 + BC^2 \to AC^2 = 5 + \frac{12}{5} = \frac{37}{5} \to \boxed{AC = \sqrt{\frac{37}{5}}}$$

۱٫۲۵

دقت کن ☹ $\frac{2\sqrt{3}}{\sqrt{5}}$

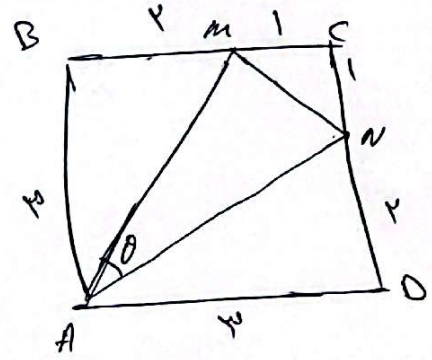
$$\sin 2C = 2 \sin C \cdot \cos C$$

$$\sin C = \frac{\sqrt{5}}{\frac{\sqrt{37}}{\sqrt{5}}} = \frac{5}{\sqrt{37}}$$

$$\cos C = \frac{\frac{2\sqrt{3}}{\sqrt{5}}}{\frac{\sqrt{37}}{\sqrt{5}}} = \frac{2\sqrt{3}}{\sqrt{37}}$$

$$\to \sin 2C = 2 \times \frac{5}{\cancel{\sqrt{37}}} \times \frac{2\sqrt{3}}{\cancel{\sqrt{37}}} = \frac{20\sqrt{3}}{37}$$

۱۰-



$$S_{\text{مربع}} = 3^2 = 9$$

$$\left.\begin{array}{l} S_{\overset{\triangle}{ADN}} = \frac{3 \times 2}{2} = 3 \\ S_{\overset{\triangle}{ABM}} = \frac{3 \times 2}{2} = 3 \\ S_{\overset{\triangle}{MCN}} = \frac{1 \times 1}{2} = \frac{1}{2} \end{array}\right\} S_{\overset{\triangle}{AMN}} = 9 - \frac{13}{2} = \boxed{\frac{5}{2}}$$

$$\left.\begin{array}{l} AN = \sqrt{9 + 4} = \sqrt{13} \\ AM = \sqrt{9 + 4} = \sqrt{13} \end{array}\right\} S_{\overset{\triangle}{AMN}} = \frac{1}{2} \times AM \times AN \times \sin\theta$$

$$\to \frac{5}{\cancel{2}} = \frac{1}{\cancel{2}} \times 13 \times \sin\theta$$

$$\to \sin\theta = \frac{5}{13}$$

۲

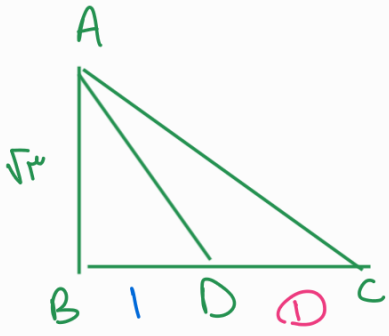
کاملاً ایجی

سوال ۱

$$\frac{\sqrt{3}(a+b)}{a-b} = -\sqrt{\frac{3}{3}} \rightarrow 3a+3b = -a+b$$

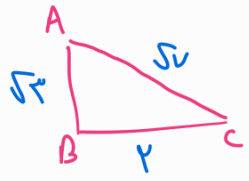
$$4a < -2b \rightarrow \frac{b}{a} = -\frac{2a}{a} = -2$$

سوال ۹



$$S_{ABC} = \sqrt{3}$$

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



$$\rightarrow \sin 2\hat{C} = 2 \times \frac{\sqrt{3}}{\sqrt{7}} \times \frac{2}{\sqrt{7}} = \frac{4\sqrt{3}}{7}$$