نام: دنیا احمدی — شماره نشست: ۱۲ — کلاس: دوازدهم دختران B — ۱۹

①
$$\frac{a(-\frac{\sqrt2}{2})+b(-\frac{\sqrt2}{2})}{a(-\frac12)+b(\frac12)} = \frac{-\frac{\sqrt2}{2}(a+b)}{\frac12(b-a)} = \frac{-\sqrt2(a+b)}{b-a} = \tan\frac{5\pi}{6} = -\frac{\sqrt3}{3} \to 4a=-2b \Rightarrow \frac{b}{a}=-2$$
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②
$P\,|\,\frac12, y \to \cos\alpha = \frac12$ (ناحیه اول) $\alpha = 60^\circ$ (۲۱۰ درجه پادساعتگرد) $\alpha = 210^\circ$

دقت کن !!

$\to x^2 = 1^2+1^2-2(1)\cos150$

$x^2 = 2+\sqrt3 \to x=\sqrt{2+\sqrt3}$

محیط $= 1+1+\sqrt{2+\sqrt3} = 2+\sqrt{2+\sqrt3}$

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③
عقربه ساعت $= \frac{2\pi}{12} = \frac{\pi}{6} \to$ زمان گذشته $= \frac{\frac{\pi}{9}}{\frac{\pi}{6}} = \frac23$ ساعت $= 40' \to 2:40$
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④
$20 = |\frac{11}{2}m - 90| \to \frac{11}{2}m = 70 \to m = 12/7$ بار اول

$\frac{11}{2}m = 110 \to m=20$ بار دوم → پس از ۲۰ دقیقه
۲

⑤
$-\frac{\pi}{6} < x < \frac{5\pi}{6} \to$  $\to -\frac12 < \sin x \le 1 \to -\frac12 < \frac{m-3}{5} \le 1 \to \frac12 < m \le 8 \to m\in(\frac12, 8]$
۲

⑥
$$\frac{\sin(90+15)+k\cos(270-15)}{\cos(180-15)+2\sin(180+15)} = \frac{\cos15 - k\sin15}{-\cos15-2\sin15} = 3 \to \cos15 - k\sin15 = -3\cos15 - 6\sin15 \to \frac{\sin15}{\cos15} = \frac{-4}{6-k}$$

$$\tan15 = \frac{\sin15}{\cos15} = \frac{-4}{6-k} = \frac14 \to k=22$$
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راه حل سوال ۷ پشت برگه نوشته شد

⑦
$2(1+\cos x) = 1-\cos x \to \cos x = -\frac13 \to \sin^2 x = 1-\cos^2 x \to \sin x = \sqrt{1-(-\frac13)^2} = \frac{2\sqrt2}{3}$

$\tan\alpha = \frac{\sin\alpha}{\cos\alpha} = -2\sqrt2 \quad \cot\alpha = \frac{1}{\tan\alpha} = -\frac{\sqrt2}{4} \longrightarrow \frac{\tan(\frac{\pi}{2}-x)-\cot(\pi-x)}{\cot(\frac{3\pi}{2}-x)+2\tan(3\pi-x)} = \frac{\cot x-(-\cot x)}{~~\tan x + 2\tan x~~} = -2\cot^2 x$

$\cot x = -\frac{1}{2\sqrt2} \to -2\times\cot^2 x = -2\times\frac18 = -\frac14$

$\tan x$, $-2\tan x$, $-\tan x$

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⑧
$108\times\frac{\pi}{180} = \frac{3\pi}{5} \to l_A = l_B \to \theta_A r_A = \theta_B r_B \to \frac{3\pi}{5}r_A = \frac{9\pi}{10}r_B \to \frac{r_A}{r_B} = \frac32 \to \frac{S_A}{S_B} = (\frac{r_A}{r_B})^2 = \frac94$
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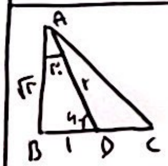
⑨


$\sin30 = \frac12 \to AD = 2$

$\cos30 = \frac{\sqrt3}{2} \to AB = \sqrt3$

$S_{ABC} = \frac{AB\times BC}{2} = \frac{\sqrt3}{2}BC = \sqrt3 \to BC = 2$

$AC^2 = AD^2 + BC^2 \to AC = \sqrt{3+4} = \sqrt7$

$\sin2C = 2\sin C\cos C = \frac21\times\frac{2}{\sqrt7}\times\frac{\sqrt3}{7} = \frac{4\sqrt3}{7}$
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⑩
$MN = \sqrt{1+1} = \sqrt2 \quad AM = \sqrt{4+9} = \sqrt{13} \quad AN = \sqrt{4+9} = \sqrt{13}$

$S_{AMN} = S_{ABCD} - (S_{ABM}+S_{MNC}+S_{AND}) = 9 - \frac{13}{2} = \frac52$

$S_{AMN} = \frac52 = \frac12 AM.AN.\sin\theta \to \frac52 = \frac12\times\sqrt{13}\times\sqrt{13}\times\sin\theta \to \sin\theta = \frac{5}{13}$
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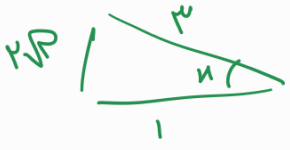
$$1-\cos x = 2+2\cos x \rightarrow \cos x = -\frac{1}{2}$$

$$\frac{\cot x + \cot x}{\tan x - 2\tan x} = \frac{2\cot x}{-\tan x} = -2\cot^2 x$$



$$\rightarrow \cot x = -\frac{1}{2\sqrt{2}} \rightarrow -2\cot^2 x = -2\times\frac{1}{8} = -\frac{1}{4}$$