یسنا قراخانی تکلیف ۱۹ دبیرستان دخترانه

①

الف)

$= 270 + 9 + 2(30) = 153^\circ$

ب)

$\alpha = |30h - 15M| \rightarrow |30 \times 3 - 15 \times 34| = |-270| = 270$

$= 270 \rightarrow 360 - 270 = 153^\circ$

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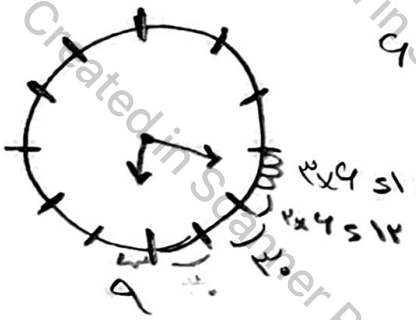
②

الف



$\alpha = 120 + 2(30) + 9 = 81^\circ$

ب

$\alpha = |30h - 15M| = |30(9) - 15(18)|$

$= |270 - 270| = 81^\circ$

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③

$\alpha = \frac{\pi}{6} \quad R = 3cm$

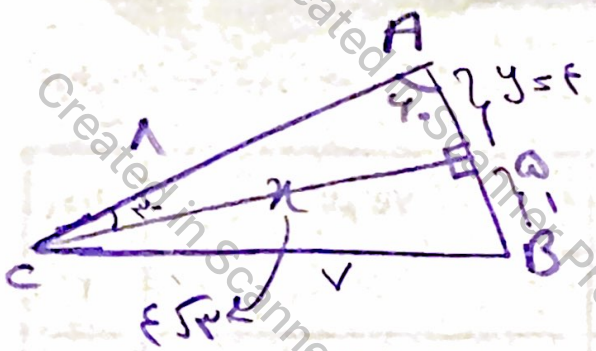
الف)

$S = \frac{\alpha}{2} R^2 \rightarrow \frac{\pi}{12} \times 9 = \frac{3\pi}{4}$

ب)

$|AB| = \alpha R \rightarrow \frac{\pi}{6} \times 3 = \frac{\pi}{2} + 3 + 3 = \frac{\pi}{2} + 6$

۴



الف) $S = \frac{۱}{۲} \times AC \times BC \times \sin A$

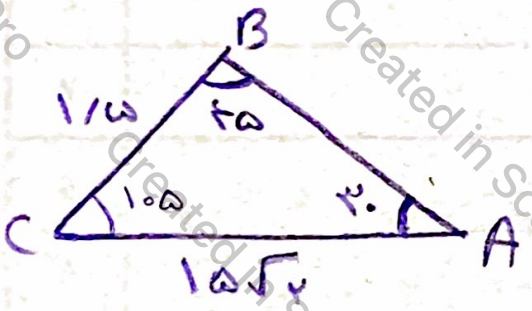
$S = \frac{۱}{۲} \times ۸ \times ۵ \times \frac{\sqrt{۳}}{۲} = \boxed{۱۰\sqrt{۳}}$

$x = \frac{\sqrt{۳}}{\cancel{۲}} \times \overset{۴}{\cancel{۸}} = ۴\sqrt{۳} \rightarrow y = \frac{۱}{۲} \times ۸ = ۴$

$CB = \sqrt{۱ + ۴۸} = \sqrt{۴۹} = ۷$

$P = ۵ + ۸ + ۷ = \boxed{۲۰}$

۵



$\hat{A} + \underbrace{\hat{B} + \hat{C}}_{۱۵۰} = ۱۸۰ \rightarrow A = ۳۰$

$\frac{BC}{\sin \underset{۳۰}{\cancel{A}}} = \frac{AC}{\sin B} \rightarrow \frac{۱۵}{\frac{۱}{۲}} = \frac{۱۵\sqrt{۲}}{\sin B}$

$۳۰ \sin B = ۱۵\sqrt{۲}$

$\sin B = \frac{\sqrt{۲}}{۲} \rightarrow \begin{cases} B = ۴۵^\circ \checkmark \text{ حاده} \\ B = ۱۳۵^\circ \end{cases}$

$B = ۴۵ \rightarrow \boxed{\frac{\pi}{۴}}$

$C = ۱۰۵ = \boxed{\frac{۷}{۱۲}}$

۶

$$\frac{\tan(\pi - \alpha) + ۳\tan(\pi + \alpha)}{\tan(۲\pi - \alpha) - \tan(۲\pi + \alpha)} \Rightarrow \frac{-\tan(\alpha) + ۳\tan(\alpha)}{-\tan(\alpha) - (+\tan(\alpha))}$$

$$\Rightarrow \frac{۲\tan(\alpha)}{-۲\tan(\alpha)} = \boxed{-۱}$$

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(۷)

$$A = \frac{2\tan 70 + \tan 10}{3\tan 19^\circ - \tan 25^\circ} = \frac{2\tan(90-10^\circ) + \tan(90+10^\circ)}{3\tan(180-10^\circ) - \tan(270-10^\circ)}$$

$$\frac{\pi}{12} \times \frac{180}{\pi} = 15^\circ \quad \Rightarrow \quad \frac{+2\cot(10) - \cot(10)}{-3\tan(10) + \cot(10)} = \frac{\cot(10)}{-3\tan(10) - \cot(10)}$$

$$\tan\frac{\pi}{12} = \alpha$$

$$\tan 15^\circ = \alpha \rightarrow \cot 15^\circ = \frac{1}{\alpha}$$

$$\hookrightarrow \frac{\frac{1}{\alpha}}{-3\alpha + \frac{1}{\alpha}} = \frac{\frac{1}{\alpha}}{\frac{-3\alpha^2+1}{\alpha}} = \frac{1}{-3\alpha^2+1}$$

$$= \boxed{\frac{-1}{3\alpha^2+1}}$$

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(۸)

$$\frac{\sin^2\theta + \cos^2\theta + 2\sin\cos \quad \sin^2\theta + \cos^2\theta - 2\sin\cos}{(\sin+\cos)^2 + (\sin-\cos)^2} = \frac{2(\sin^2+\cos^2)}{\sin^2-\cos^2} = 2$$

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

$$2(\sin^2-\cos^2) = 2$$

$$\sin^2 - \cos^2 = \frac{2}{2}$$

$$\sin^2 = 1-\cos^2$$

$$1 - \cos^2 - \cos^2 = \frac{2}{2}$$

$$1 + \tan^2 = \frac{1}{\cos^2} \rightarrow 1 + \tan^2 = \frac{1}{\frac{1}{9}}$$

$$1 - 2\cos^2 = \frac{2}{2}$$

$$-2\cos^2 = \frac{-1}{3}$$

$$1 + \tan^2 = 9 \rightarrow \tan^2 = \boxed{8}$$

$$\cos^2 = \frac{1}{9}$$

$$\cos = \pm\frac{1}{\sqrt{9}}$$

(۹)

$$\frac{\sin^2 - 2\cos^2 + 1}{\sin^2 + 2\cos^2 - 1} = 4 \rightarrow \frac{1-\cos^2 - 2\cos^2 + 1}{1-\cos^2 + 2\cos^2 - 1} = \frac{2 - 3\cos^2}{\cos^2} = 4$$

$$4\cos^2 = 2 - 3\cos^2 \rightarrow 7\cos^2 = 2 \rightarrow \cos^2 = \frac{2}{7}$$

$$1 + \tan^2 = \frac{1}{\cos^2} \Rightarrow 1 + \tan^2 = \frac{7}{2}$$

$$\tan^2 = \frac{7-2}{2} = \frac{5}{2}$$

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(۱۰)

الف) $\cos(22.5) \rightarrow \cos^2 = \frac{1+\cos 2\alpha}{2} \rightarrow \cos^2 22.5 = \frac{1+\cos 45}{2}$

$$= \frac{1 + \frac{\sqrt{2}}{2}}{2} = \frac{\frac{2+\sqrt{2}}{2}}{\frac{2}{1}} = \frac{2+\sqrt{2}}{4} \rightarrow \cos 22.5 = \frac{\sqrt{2+\sqrt{2}}}{2}$$

ب) $\sin(67.5) \rightarrow \sin^2 = \frac{1-\cos 2\alpha}{2} \rightarrow \sin^2 67.5 = \frac{1-\cos 135}{2}$

$$= \frac{1-\left(\frac{-\sqrt{2}}{2}\right)}{2} = \frac{2+\sqrt{2}}{4} \rightarrow \sin 67.5 = \frac{\sqrt{2+\sqrt{2}}}{2}$$