باران برادی

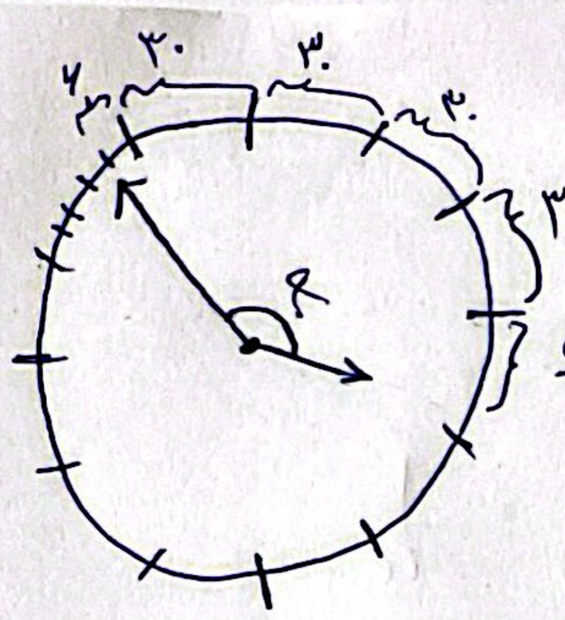
① الف)

۳۰ ۳۰ ۳۰ ۳۰ ۲۷ ۶

۱۲۰

$= 153$

۳:۵۴′



$\frac{54}{2} = 27$

ب)

$a = |\omega/\omega\, m - 30h| = |\frac{11}{60} \times 54 - 30 \times 3| = |297 - 90|$

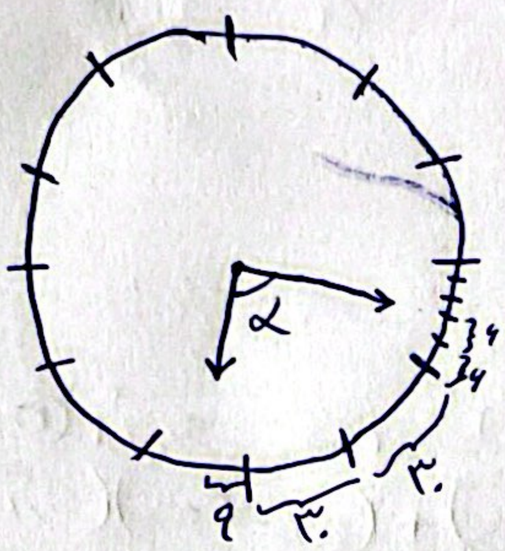
$= 207$

$360 - 207 = 153$

② الف)

۹:۱۸′

$\frac{18}{2} = 9$



$\alpha = 30 + 30 + 15 + 9 = 81$

ب)

$a = |\frac{11}{60} \times 18 - 30 \times 6| = |99 - 180|$

$= 81$

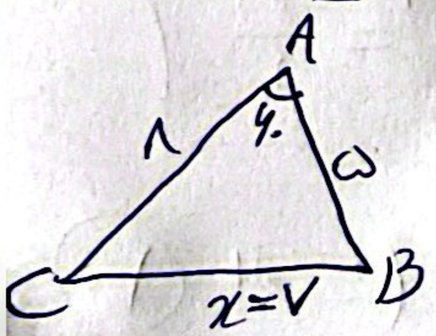
③

$S_{AOB} = \frac{a}{2} r^2 = \frac{\pi}{6} \times 3^2 = \frac{\pi}{24} \times 9 = \frac{3\pi}{8}$

$P_{\text{قطاع}} = 3 + 3 + ar = 6 + \frac{\pi}{12} \times 3 = 6 + \frac{\pi}{4}$

④ الف)

$S_\Delta = \frac{1}{2} ab \sin A = \frac{1}{2} \times 8 \times 10 \times \frac{\sqrt{3}}{2} = 10\sqrt{3}$



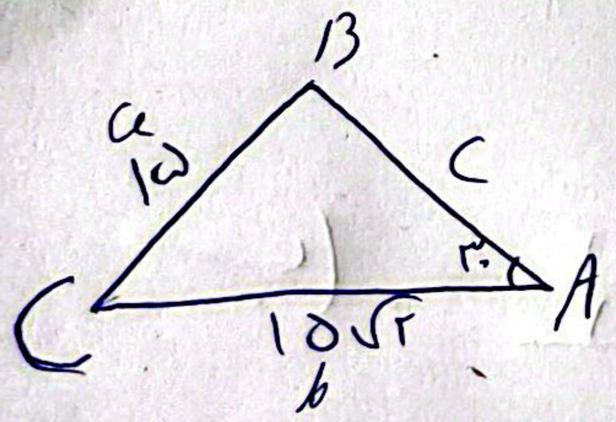
ب)

$x = \sqrt{a^2 + b^2 - 2ab\cos A} = \sqrt{64 + 100 - 2 \times 8 \times 10 \times \frac{1}{2}}$

$= \sqrt{49} = 7$

$P_\Delta = 7 + 8 + 10 = 25$

⑤



$A + B + C = 180$

$A = 30$

$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

$\frac{1}{30} \quad \frac{1/2}{10} = \frac{\sin B}{10\sqrt{3}} \rightarrow \sin B = \frac{10\sqrt{3}}{120} = \frac{\sqrt{3}}{2}$

$B = 60 = \frac{\pi}{3}$

$\Rightarrow 180 - 120 = 105$

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

(۹)

$$\frac{-\tan + 2\tan}{-\tan - (\tan)} = \frac{2\tan}{-2\tan} = \boxed{-1}$$

(۷)

$$\tan\frac{\pi}{12} = a \rightarrow \tan 15 = a \;,\; \cot = \frac{1}{\tan} = \frac{1}{a}$$

$$\frac{x}{\frac{\pi}{12}} = \frac{x}{15} \rightarrow x = \frac{15\pi}{12} = 15$$

$$\frac{2\tan(\frac{\pi}{2}-15)+\tan(\frac{\pi}{4}+15)}{2\tan(\pi-15)-\tan(\frac{3\pi}{2}-15)} = \frac{2\times\frac{1}{a}+(-\frac{1}{a})}{2\times(-\tan)-\frac{1}{a}} = \frac{\frac{1}{a}}{-2a-\frac{1}{a}} = \frac{\frac{1}{a}}{\frac{-2a^2-1}{a}}$$

$$= \frac{\not{a}}{\not{a}(-2a^2-1)} = \boxed{\frac{1}{-(2a^2+1)}}$$

(۱۱)

$$\frac{\sin+\cos}{\sin-\cos} + \frac{\sin-\cos}{\sin+\cos} = \frac{(\sin+\cos)(\sin+\cos)+(\sin-\cos)(\sin-\cos)}{(\sin-\cos)(\sin+\cos)}$$

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

$$= \frac{\times\frac{1}{\cos^2}(2\sin^2+2\cos^2)}{\frac{1}{\cos^2}\times(\sin^2-\cos^2)} = \frac{2\tan^2+2}{\tan^2-1} = 3 \rightarrow 2\tan^2-3 = 2\tan^2+2$$

$$\boxed{\tan^2 = 5}$$

(۹)

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

$$\frac{\frac{2\sin^2}{\cos^2}-\frac{\cos^2}{\cos^2}}{\frac{2\cos^2}{\cos^2}} = 2 \rightarrow 2\tan^2 = 5$$

$$\boxed{\tan^2 = \frac{5}{2}}$$

(۱۰ الف)

$$\cos(22/5^\circ) \rightarrow \cos^2\alpha = \frac{1+\cos 2\alpha}{2} \rightarrow \cos(22/5)^2 = \frac{1+\cos 45}{2}$$

$$\Rightarrow \cos^2\alpha = \frac{1+\frac{\sqrt{2}}{2}}{2} \Rightarrow \sqrt{\frac{2+\sqrt{2}}{4}} = \cos\alpha = \boxed{\frac{\sqrt{2+\sqrt{2}}}{2}}$$

(ب)

$$\sin^2\alpha = \frac{1-\cos 2\alpha}{2} \rightarrow \sin(45/5)^2 = \frac{1-\cos 135}{2} = \frac{1-\frac{-\sqrt{2}}{2}}{2}$$

$$= \frac{2+\sqrt{2}}{4} \rightarrow \sin\alpha = \boxed{\frac{\sqrt{2+\sqrt{2}}}{2}}$$