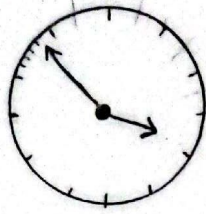


سوال ۱



$$4 \times 30 = 120$$

$$5 \times 6 = 30$$

$$\frac{54}{2} = 27 \rightarrow 30 - 27 = 3$$

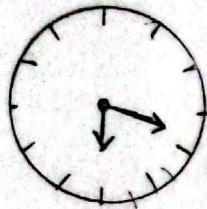
$$\left. \begin{array}{l} 120 + 30 + 3 = 153 \end{array} \right\} \text{الف (الف)}$$

$$\Rightarrow |5,5M - 30h|$$

$$\Rightarrow |5,5 \times 54 - 30 \times 3| = |297 - 90| = 207$$

$$340 - 207 = 133^\circ$$

ب



$$1 \times 30 = 30$$

$$\frac{11}{2} = 5.5 \rightarrow 30 - 5.5 = 24.5$$

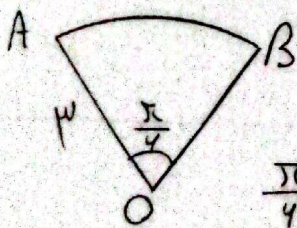
$$\left. \begin{array}{l} 30 + 24.5 = 54.5 \end{array} \right\} \text{الف (الف)}$$

سوال ۲

$$\Rightarrow |5,5M - 30h|$$

$$|5,5 \times 11 - 30 \times 4| = |60.5 - 120| = 59.5$$

ب



$$\frac{\pi}{4} = 30^\circ$$

$$S = \frac{\theta}{2} R^2 = \frac{30}{2} \times 3^2$$

$$\rightarrow 15 \times 9 = 135$$

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

$$\widehat{AB} = a R \rightarrow \frac{\pi}{4} \times 3 = \frac{\pi}{2}$$

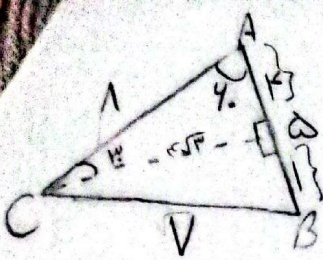
$$30 \times 3 = 90$$

$$P = 30 + 30 + \frac{\pi}{2} = 90 + \frac{\pi}{2} = \frac{180 + \pi}{2}$$

$$\rightarrow 90 + 90 = 180$$

سوال ۴

(الف)



$$S = \frac{1}{2} \times AB \times AC \times \sin \theta$$

$$S = \frac{1}{2} \times 1 \times 2 \times \sin 60^\circ \Rightarrow \frac{1}{2} \times 1 \times 2 \times \frac{\sqrt{3}}{2} = \frac{1}{2} \sqrt{3}$$

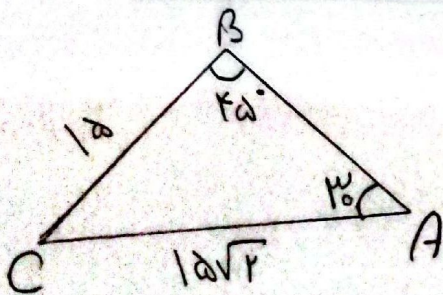
$$\text{ضلع } AB = \frac{1}{2} \times 1 = \frac{1}{2}$$

$$\text{ضلع } AC = \frac{\sqrt{3}}{2} \times 1 = \frac{\sqrt{3}}{2}$$

$$BC^2 = 1^2 + (\frac{\sqrt{3}}{2})^2 = \sqrt{1 + (\frac{\sqrt{3}}{2})^2} = \sqrt{4} = 2 \quad (\text{ب})$$

$$P = V + 1 + 2 = 5$$

سوال ۵



$$\frac{a}{\sin A} = \frac{b}{\sin B} \Rightarrow \frac{1}{\sin 45^\circ} = \frac{1}{\sin B}$$

$$\frac{1}{\sin 45^\circ} = \frac{1}{\sin B} \Rightarrow \sin B = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \Rightarrow \hat{B} = 45^\circ$$

$$\hat{C} = 180^\circ - (45^\circ + 45^\circ) = 90^\circ$$

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

$$\tan(\pi - a) = \tan(-a + \pi) \rightarrow \tan(\pi - a) = -\tan a$$

$$\tan(2\pi - a) = \tan(-a) = -\tan a$$

$$\tan \frac{\pi}{4} = \tan 45^\circ = 1 \quad \tan 135^\circ = \cot 45^\circ = \frac{1}{\tan 45^\circ} = \frac{1}{1} = 1$$

سوال ۷

$$\begin{aligned} \tan 105^\circ &= \tan(45^\circ + 60^\circ) = -\cot 15^\circ = -\frac{1}{a} \\ \tan 145^\circ &= \tan(180^\circ - 35^\circ) = -\tan 35^\circ = -a \\ \tan 165^\circ &= \tan(180^\circ + 15^\circ) = \tan 15^\circ = \frac{1}{a} \end{aligned}$$

$$\Rightarrow \frac{2 \times (\frac{1}{a}) + (-\frac{1}{a})}{2(-a) - \frac{1}{a}} = \frac{\frac{2}{a} - \frac{1}{a}}{-2a - \frac{1}{a}} = \frac{\frac{1}{a}}{-\frac{2a^2 + 1}{a}} = \frac{1}{-2a^2 - 1}$$

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

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

$$\sin^2 x + \cos^2 x = 1$$

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

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

$$\frac{1}{\cos x} = \sec x$$

$$\frac{\sin^2 x - 2\cos^2 x + 1}{\sin^2 x + 2\cos^2 x - 1} = \varepsilon \rightarrow \frac{1 - \cos^2 x - 2\cos^2 x + 1}{1 - \cos^2 x + 2\cos^2 x} \Rightarrow \frac{2 - 3\cos^2 x}{\cos^2 x} = \varepsilon \quad \text{سوال 9}$$

$$2 - 3\cos^2 x = \varepsilon \cos^2 x \Rightarrow 2 = \varepsilon \cos^2 x \rightarrow \cos^2 x = \frac{2}{\varepsilon}$$

$$\sin^2 x = 1 - \frac{2}{\varepsilon} = \frac{\varepsilon - 2}{\varepsilon} \rightarrow \tan^2 x = \frac{\sin^2 x}{\cos^2 x} = \frac{\frac{\varepsilon - 2}{\varepsilon}}{\frac{2}{\varepsilon}} = \frac{\varepsilon - 2}{2} = \frac{\varepsilon}{2} - 1 \quad \text{سوال 10}$$

$$\text{الف) } \cos^2 x = \frac{1 + \cos 2x}{2} \rightarrow \cos^2 45^\circ = \frac{1 + \cos 90^\circ}{2}$$

$$\cos^2 45^\circ = \frac{1 + \frac{\sqrt{2}}{2}}{2} = \frac{2 + \sqrt{2}}{4} = \frac{2 + \sqrt{2}}{4} \rightarrow \cos 45^\circ = \sqrt{\frac{2 + \sqrt{2}}{4}} = \frac{\sqrt{2 + \sqrt{2}}}{2}$$

$$\text{ب) } \sin 45^\circ = \cos (90^\circ - 45^\circ) = \cos 45^\circ \rightarrow \sin 45^\circ = \frac{\sqrt{2 + \sqrt{2}}}{2}$$