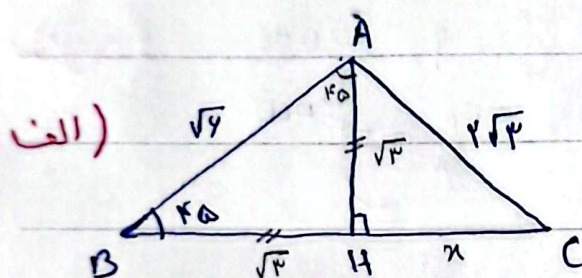


الف) $(\sin 135^\circ + \sin 150^\circ)(\cos 135^\circ - \cos 150^\circ) =$

سؤال:

$$\left[\frac{\sqrt{2}}{2} + \left(-\frac{\sqrt{3}}{2} \right) \right] \left[\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \right] = \frac{2}{4} - \frac{3}{4} = -\frac{1}{4}$$

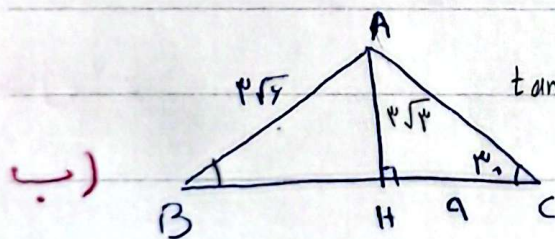
ب) $\frac{1 + 3 \tan^2 210^\circ}{4 \cos^2 330^\circ + 2 \cos^2 225^\circ} = \frac{1 + 3 \times \frac{3}{4}}{4 \times \frac{3}{4} + 2 \times \frac{2}{4}} = \frac{1+1}{3+1} = \frac{2}{4} = \frac{1}{2}$



$AH = BH \rightarrow 2AH^2 = 4 \rightarrow AH = \sqrt{2}$

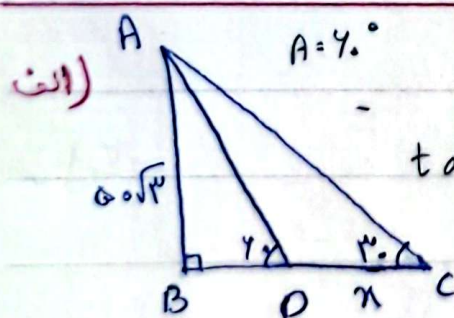
$x^2 + 3 = 12 \rightarrow x = 3$

سؤال 2: طول HC



$\tan 30^\circ: \frac{AH}{x} = \frac{\sqrt{3}}{3} \rightarrow AH = 2\sqrt{3}$

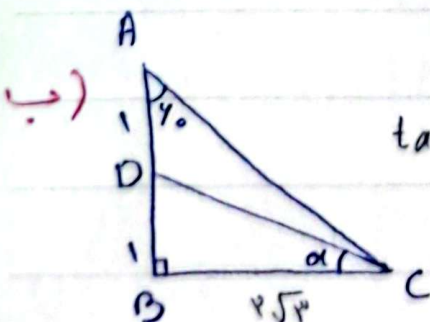
$\sin B = \frac{2\sqrt{3}}{3\sqrt{4}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \Rightarrow B = 45^\circ$



$\tan A = \frac{BC}{5\sqrt{3}} = \frac{\sqrt{3}}{1} \rightarrow BC = 150$

$\triangle ABD: \tan D = \frac{5\sqrt{3}}{BD} = \frac{\sqrt{3}}{1} \rightarrow BD = 50 \Rightarrow x = 150 - 50 = 100$

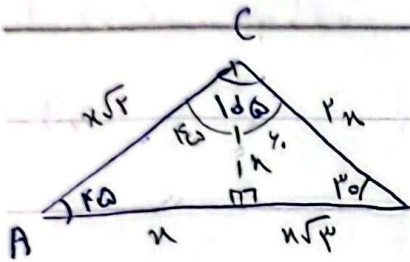
سؤال 3:



$\tan A = \frac{BC}{2} = \sqrt{3} \rightarrow BC = 2\sqrt{3} \rightarrow OC^2 = 12 + 1 = 13 \rightarrow DC = \sqrt{13}$

$\sin \alpha = \frac{1}{\sqrt{13}} = \frac{\sqrt{13}}{13}$

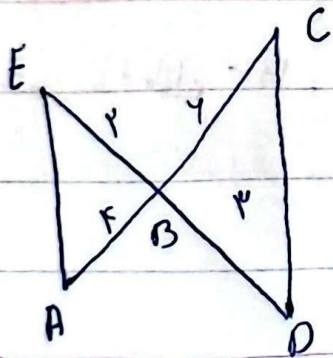
سؤال ٤:



$$S_{ABC} = \frac{1}{2} \cdot AB \cdot AC \cdot \sin 45 = \frac{1}{2} \cdot AC \cdot BC \cdot \sin 105 = \frac{1}{2} \cdot BC \cdot AB \cdot \sin 30$$

$$\frac{AB}{AC} = \frac{BC}{AB}$$

$$AB = x(1 + \sqrt{3}) \quad AC = x\sqrt{2} \quad \Rightarrow \quad \frac{AB}{AC} = \frac{x(1 + \sqrt{3})}{x\sqrt{2}} = \frac{(1 + \sqrt{3})\sqrt{2}}{2} = \frac{\sqrt{2} + \sqrt{6}}{2}$$



$$\frac{S_{ABE}}{S_{BCD}} = \frac{S_{ABE}}{S_{BCD}}$$

$$\frac{S_{ABE}}{S_{BCD}} = \frac{\frac{1}{2} \times 2 \times 4 \times \sin B}{\frac{1}{2} \times 4 \times 3 \times \sin B} = \frac{4}{6} = \frac{2}{3}$$

سؤال ٥:

$$\text{الف: } \frac{4 \times 3 \times \sin 120^\circ}{\frac{\sqrt{3}}{2}} = 4\sqrt{3}$$

$$\text{ب: } \frac{1}{2} \times 4 \times 3 \times \frac{\sqrt{3}}{2} = 3\sqrt{3}$$

سؤال ٦:

$$y = ax + b$$

$$Q = \begin{pmatrix} 1 \\ 4 \end{pmatrix} \rightarrow \begin{cases} 4 = 3a + b \end{cases}$$

$$P = \begin{pmatrix} 1 \\ 2 \end{pmatrix} \rightarrow \begin{cases} 2 = -a + b \end{cases}$$

$$2 = 4a \rightarrow a = \frac{1}{2}$$

$$+ \text{ باجهت } \tan \theta = \frac{1}{4} \rightarrow 1 + \tan^2 \theta = \frac{1}{\cos^2 \theta} \rightarrow 1 + \frac{1}{16} = \frac{1}{\cos^2 \theta}$$

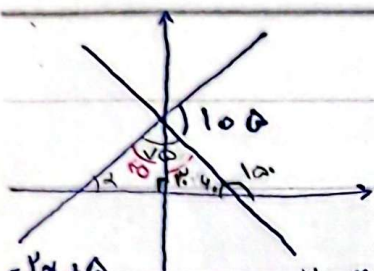
$$\cos \theta = \pm \frac{4}{5} \xrightarrow{\text{باجهت}} \frac{4}{5}$$

$$- \text{ باجهت } \tan \theta = -\frac{1}{4} \rightarrow 1 + \tan^2 \theta = \frac{1}{\cos^2 \theta} =$$

$$= 1 + \frac{1}{16} = \frac{17}{16} \rightarrow \cos \theta = \pm \frac{4}{\sqrt{17}} \xrightarrow{\text{باجهت}} \frac{4}{\sqrt{17}}$$

سؤال ٧:

سوال ۱۰



$$b = \frac{a}{r}$$

$$ry = rx + a$$

$$y = mx + b$$

$$\rightarrow m = \tan 30^\circ = -\frac{\sqrt{3}}{2}$$

$$y = x + \frac{a}{r}$$

$$\rightarrow \tan \alpha = 1 \rightarrow \alpha = 45^\circ$$

$$mb = \sqrt{3} \times \frac{a}{r} = \frac{-a\sqrt{3}}{2}$$

$$f(x) = \cos(\pi + x) + \sin\left(\frac{\pi}{r} - x\right) - \tan\left(\frac{3\pi}{r} + x\right) \quad f\left(\frac{5\pi}{r}\right) = ? \quad \text{سوال ۹}$$

$$\downarrow f\left(\frac{5\pi}{r}\right) = \cos\left(\frac{5\pi}{r} + \pi\right) + \sin\left(\frac{\pi}{r} - \frac{5\pi}{r}\right) - \tan\left(\frac{3\pi}{r} + \frac{5\pi}{r}\right) =$$

$$= \cos\left(\frac{5\pi}{r}\right) - \cos\left(\frac{5\pi}{r}\right) - \cot\left(\frac{5\pi}{r}\right) = -\cot\left(\frac{5\pi}{r}\right) = -\cot(15^\circ) = \sqrt{3}$$

$$\frac{\sin\left(\frac{14\pi}{r} + x\right) + \cos\left(\frac{15\pi}{r} - x\right)}{\cos(3\pi + x) - \sin(4\pi - x)} = \frac{\cos(x) - \sin(x)}{-\cos(x) + \sin(x)} =$$

سوال ۱۰

$$= \frac{-(\sin(x) - \cos(x))}{\sin(x) - \cos(x)} = -1$$