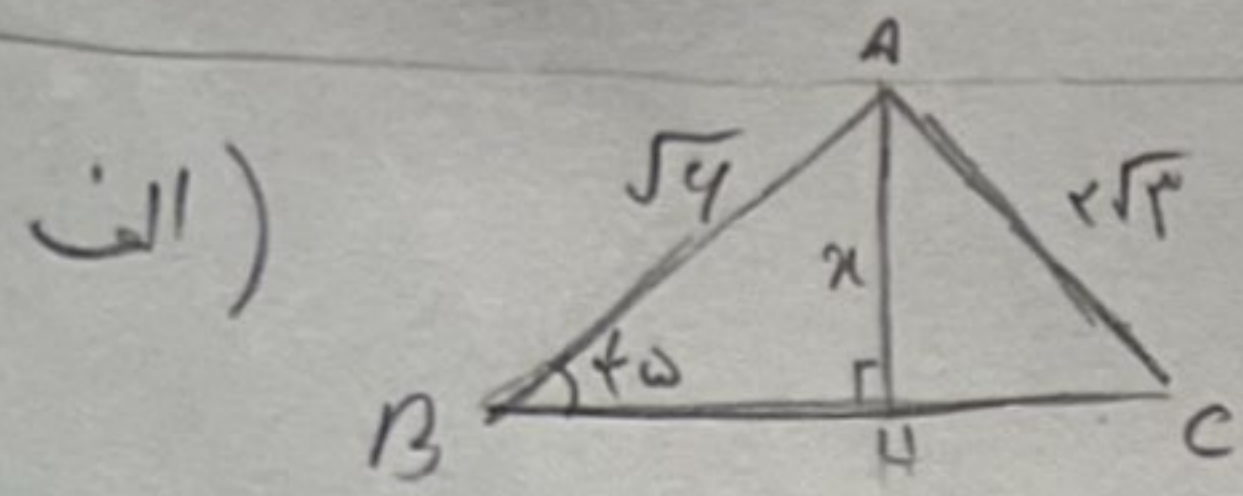


۲۵ آفرین!

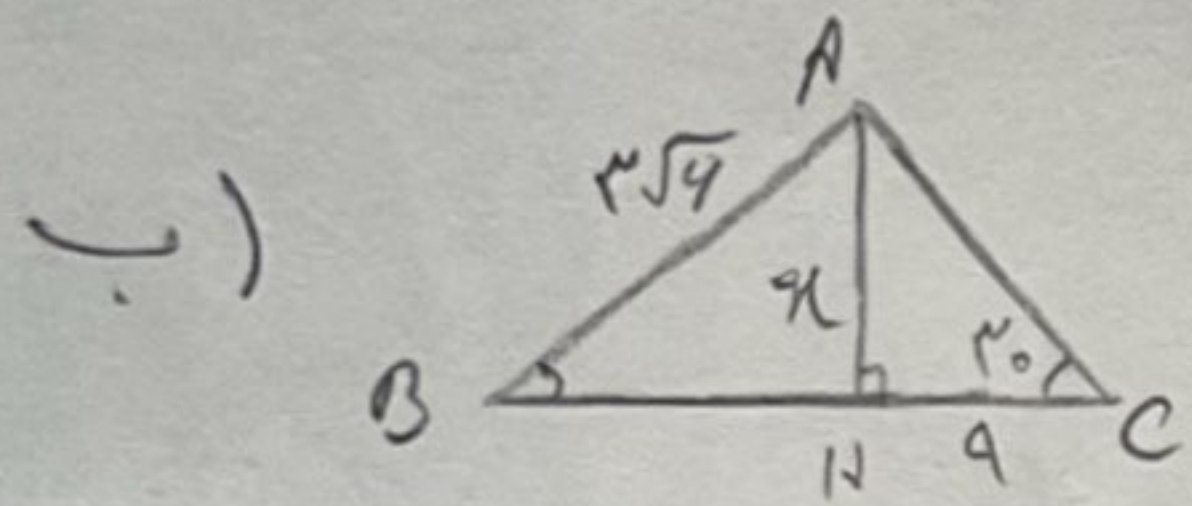
پارسا سمعی دهم بر A

الف) $(\sin 15^\circ + \sin 75^\circ)(\cos 15^\circ - \cos 75^\circ) = \left(\frac{\sqrt{2}}{2} + (-\frac{\sqrt{2}}{2})\right)\left(\frac{\sqrt{2}}{2} - (-\frac{\sqrt{2}}{2})\right) = \left(\frac{\sqrt{2}}{2}\right)^2 - \left(-\frac{\sqrt{2}}{2}\right)^2 = \frac{2}{4} - \frac{2}{4} = -\frac{1}{2}$ ✓ (۱) (۲)

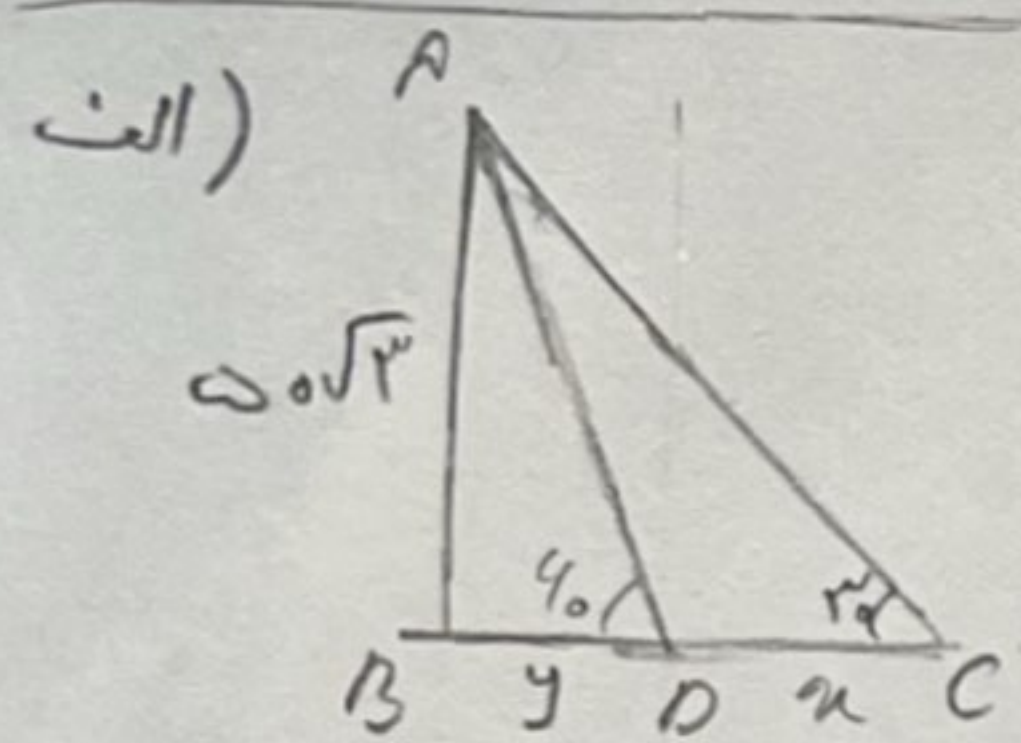
ب) $\frac{1 + 3 \tan^2 15^\circ}{1 + \cos^2 30^\circ + 2 \cos^2 15^\circ} = \frac{1 + 3 \times \frac{1}{3}}{1 + \frac{3}{4} + 2 \times \frac{1}{4}} = \frac{2}{2} = 1$ ✓



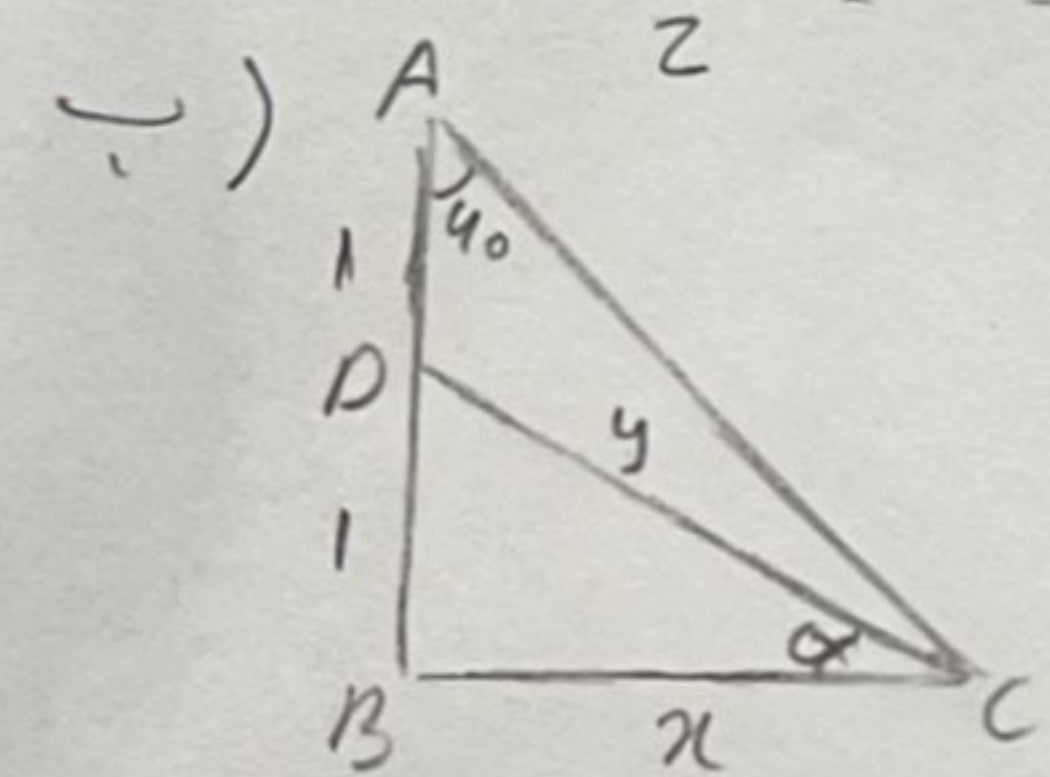
الف) $\sin 45^\circ = \frac{\sqrt{2}}{2} = \frac{x}{\sqrt{2}} \Rightarrow x = 1$ $HC = \sqrt{12 - 3} = \sqrt{9} = 3$ ✓ (۲) (۲)



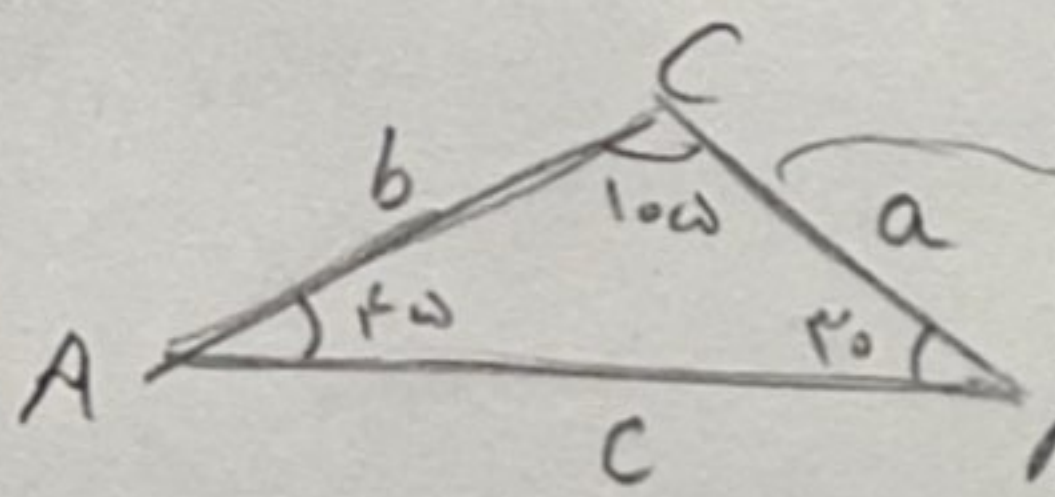
ب) $\cot 30^\circ = \frac{\sqrt{3}}{1} = \frac{9}{x} \Rightarrow x = 3\sqrt{3}$ $\sin B = \frac{3\sqrt{3}}{4\sqrt{4}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \Rightarrow B = 45^\circ$ ✓



الف) $\tan 45^\circ = \sqrt{2} = \frac{50\sqrt{2}}{y} \Rightarrow y = 50$ $\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{50\sqrt{2}}{z} \Rightarrow z = 50\sqrt{2}$ $x = z - y = 100$ ✓ (۲) (۳)

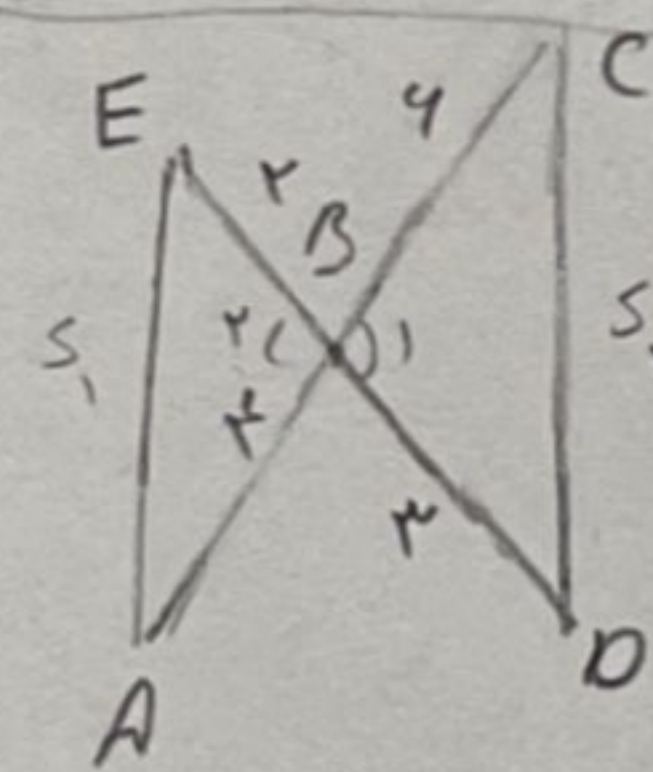


ب) $\tan 45^\circ = \sqrt{2} = \frac{x}{1} \Rightarrow x = \sqrt{2}$ $y = \sqrt{1 + 12} = \sqrt{13}$ $\sin \alpha = \frac{1}{\sqrt{13}}$ ✓



$\frac{c}{\sin 100^\circ} = \frac{b}{\sin 30^\circ}$ $\frac{c}{b} = \frac{\frac{\sqrt{2}+\sqrt{2}}{2}}{\frac{1}{2}} = \sqrt{2+\sqrt{3}}$ ✓

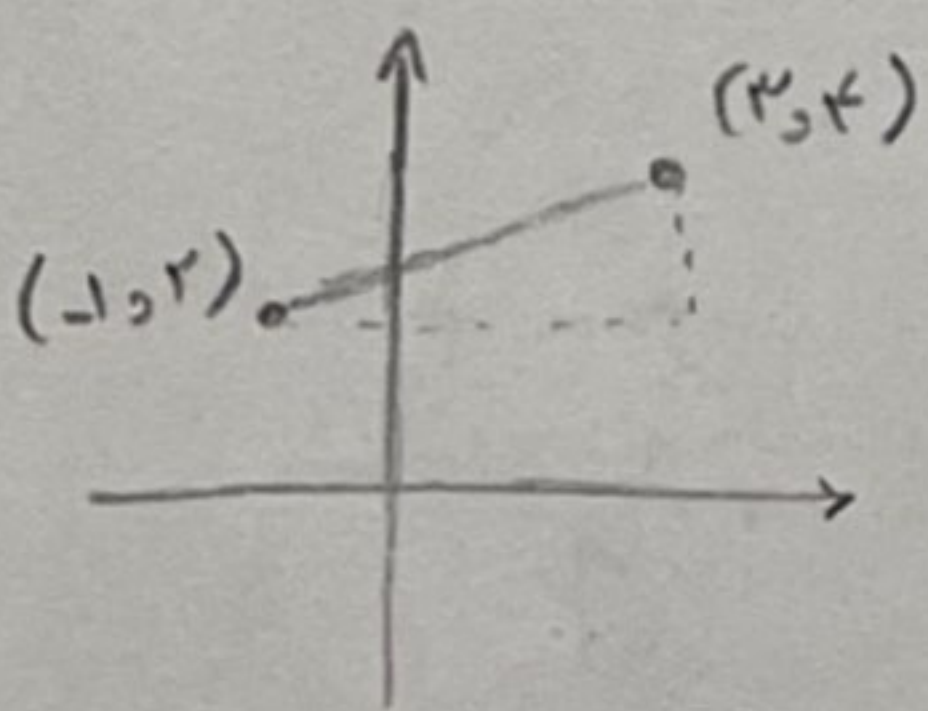
$\sin 100^\circ = \frac{1 - \cos 10^\circ}{2} = \frac{2 + \sqrt{3}}{4}$ $\Rightarrow \sin 100^\circ = \frac{\sqrt{2+\sqrt{3}}}{2}$ (۲) (۴)



$\hat{B}_1 = \hat{B}_2$ $K = \frac{AB}{BC} = \frac{EB}{BD} = \frac{r}{r}$ $\Rightarrow ABE \sim DBC$ $\left\{ \frac{S_1}{S_2} = K^2 = \left(\frac{r}{r}\right)^2 = \frac{r}{r} \right.$ ✓ (۲) (۵)

الف) $S = 2 \times \left(\frac{1}{2} \times 3 \times \frac{1}{\sqrt{3}} \times \sin 120^\circ\right) = 9\sqrt{3}$ ✓ (۲) (۶)

ب) $S = 3 \times \frac{1}{2} \times \frac{1}{\sqrt{3}} \times \sin 120^\circ = 3\sqrt{3}$ ✓



$a = \tan \theta = \frac{\Delta y}{\Delta x} = \frac{1-2}{2-(-2)} = -\frac{1}{4}$

$1 + \tan^2 \theta = \frac{1}{\cos^2 \theta} = 1 + \frac{1}{16} = \frac{17}{16} \Rightarrow \cos^2 \theta = \frac{16}{17} \Rightarrow \cos \theta = \frac{4}{\sqrt{17}}$ ✓ (۲) (۷)

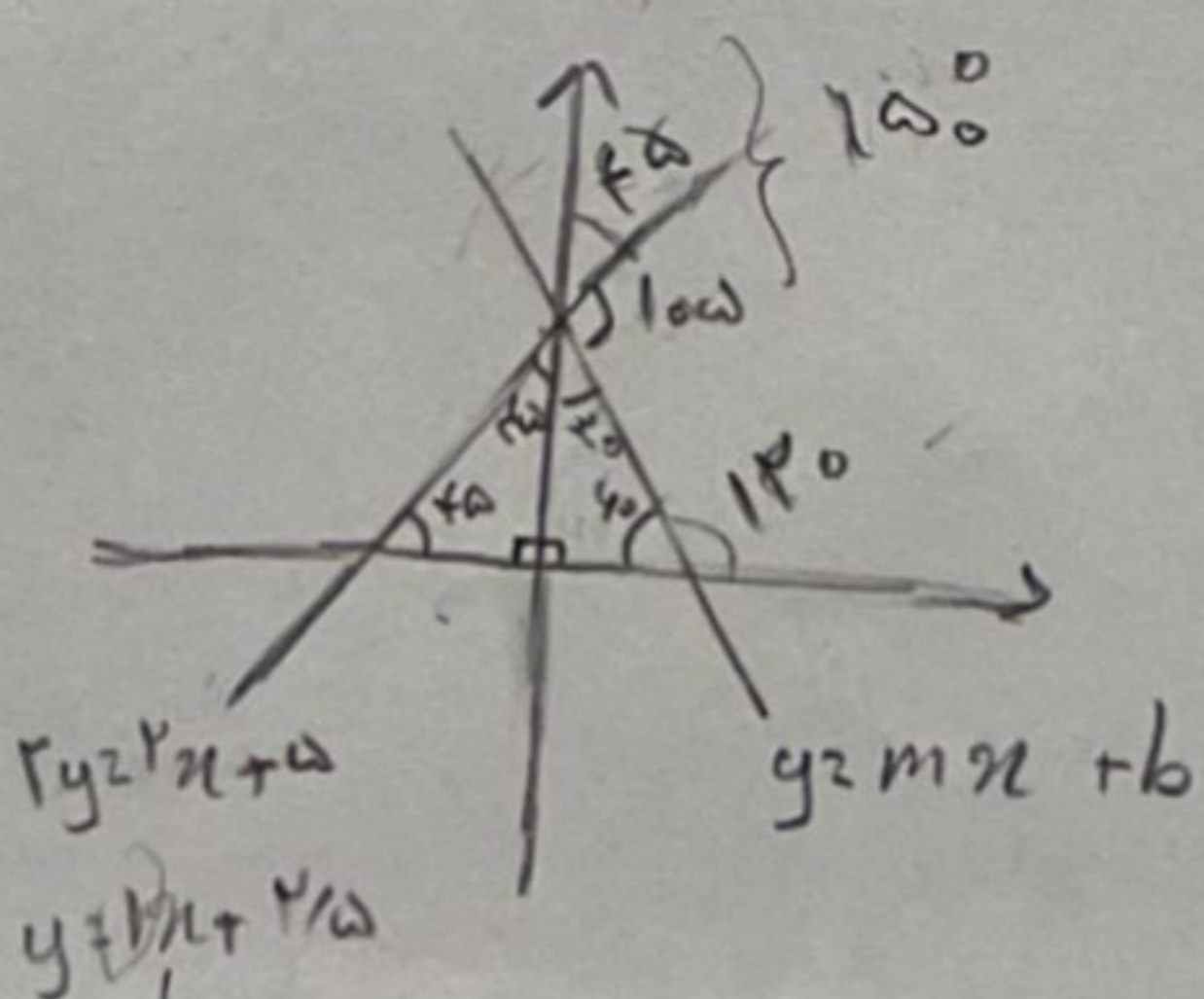
(0, 2/15)

$mx + b = x + 2/15$

$b = 2/15$

$\tan 120^\circ = -\sqrt{3} = m$

$b \times m = -2/15 \times \sqrt{3}$ ✓



$\tan \theta = 1 \Rightarrow \theta = 45^\circ$

$$f\left(\frac{5\pi}{4}\right) = \cos\left(\frac{11\pi}{4}\right) + \sin\left(-\frac{4\pi}{4}\right) - \tan\left(\frac{14\pi}{4}\right) = \cos 315^\circ - \sin 180^\circ + \tan 45^\circ =$$

$$\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} - \sqrt{2} = -\sqrt{2} \quad \checkmark$$

(r) (9)

$$\frac{\sin\left(\frac{14\pi}{5} + \pi\right) + \cos\left(\frac{15\pi}{5} - \pi\right)}{\cos(3\pi + \pi) - \sin(4\pi - \pi)} = \frac{\sin\left(\frac{2\pi}{5} + \pi\right) + \cos\left(\frac{3\pi}{5} - \pi\right)}{\cos(\pi + \pi) + \sin(-\pi)} = \frac{\cos(\pi) + \sin(\pi)}{-\cos(\pi) + \sin(\pi)} = -1$$

(r)

(10)