

19, 10

(الف)

$$(\sin 135^\circ + \sin 225^\circ)(\cos 135^\circ - \cos 225^\circ)$$

$$\left(\frac{\sqrt{2}}{2} + \left(-\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2} - \left(-\frac{\sqrt{2}}{2}\right)\right)$$

$$= \frac{2}{4} - \frac{2}{4} = -\frac{1}{2}$$

(ب)

$$\frac{1 + 2 \tan^2 22.5^\circ}{2 \cos^2 22.5^\circ + 2 \cos^2 22.5^\circ}$$

$$= \frac{1 + 2 \left(\frac{\sqrt{2}}{2}\right)^2}{2 \left(\frac{1}{2}\right)^2 + 2 \left(\frac{1}{2}\right)^2} = \frac{1 + 2 \left(\frac{1}{2}\right)}{2 \left(\frac{1}{4}\right) + 2 \left(\frac{1}{4}\right)}$$

$$= \frac{1 + 1}{1 + 1} = \frac{2}{2} = 1$$

(الف)

$$\sin 60^\circ = \frac{\sqrt{3}}{2} = \frac{AH}{AB} \Rightarrow \frac{AH}{\sqrt{4}} = \frac{\sqrt{3}}{2} \Rightarrow AH = \sqrt{3}$$

$$AH = \frac{\sqrt{2} \times \sqrt{4}}{2} = \frac{\sqrt{4}}{2} = \frac{2}{2} = 1$$

$$\sin 30^\circ = \frac{\sqrt{3}}{2\sqrt{3}} = \frac{1}{2} \rightarrow \sin 30^\circ \rightarrow 30^\circ \text{ زاویه}$$

$$\cos 30^\circ = \frac{\sqrt{3}}{2} = \frac{HC}{AC} = \frac{HC}{2\sqrt{3}} \rightarrow HC = \frac{2\sqrt{3} \times \sqrt{3}}{2} = 3$$

(ب)

$$\tan 30^\circ = \frac{\sqrt{3}}{2} = \frac{AH}{CH} = \frac{AH}{9}$$

$$AH = \frac{9\sqrt{3}}{2} = 3\sqrt{3}$$

$$\frac{3\sqrt{3}}{3\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} \rightarrow \sin 30^\circ$$

$$\hat{B} = 60^\circ$$

(الف)

$$\tan 45^\circ = \sqrt{2} = \frac{5\sqrt{2}}{BD} \rightarrow BD = 5$$

$$\tan 60^\circ = \frac{\sqrt{3}}{2} = \frac{5\sqrt{3}}{BC} \rightarrow BC = 10$$

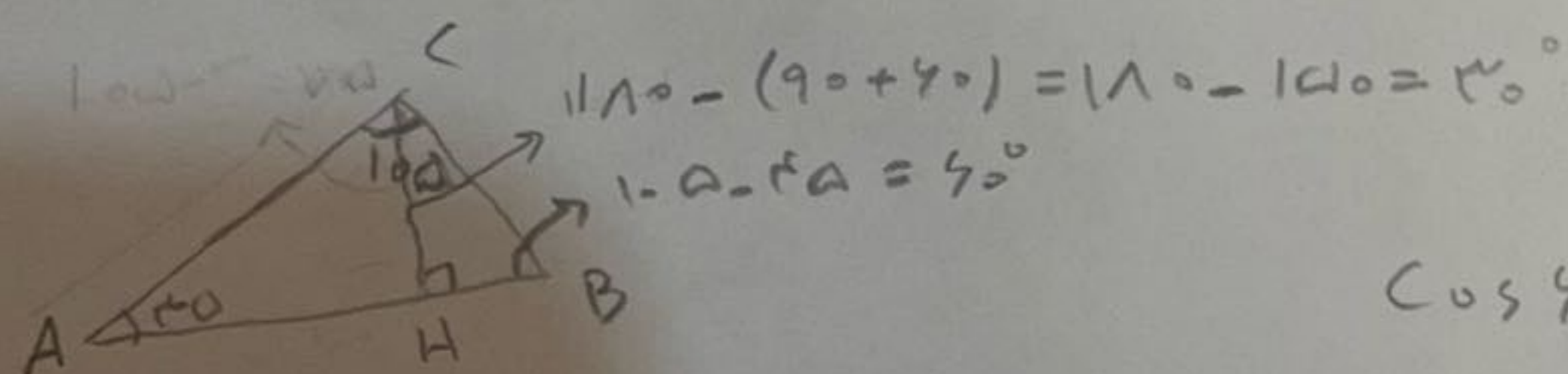
$$\angle C = \angle B = \angle D = 180^\circ - 90^\circ = 90^\circ$$

(ب)

$$\cot 45^\circ = \frac{\sqrt{2}}{2} = \frac{2}{BC} \rightarrow BC = \frac{4}{\sqrt{2}} = 2\sqrt{2}$$

$$\tan \alpha = \frac{1}{\sqrt{2}} = \frac{2\sqrt{2}}{4} = \frac{\sqrt{2}}{2} \Rightarrow \alpha = 30^\circ$$

$$\sin \alpha = \frac{1}{2}$$



$$\cos 40^\circ = \frac{1}{2} = \frac{BH}{BC} \Rightarrow \frac{BH}{BC} = \frac{1}{2}$$

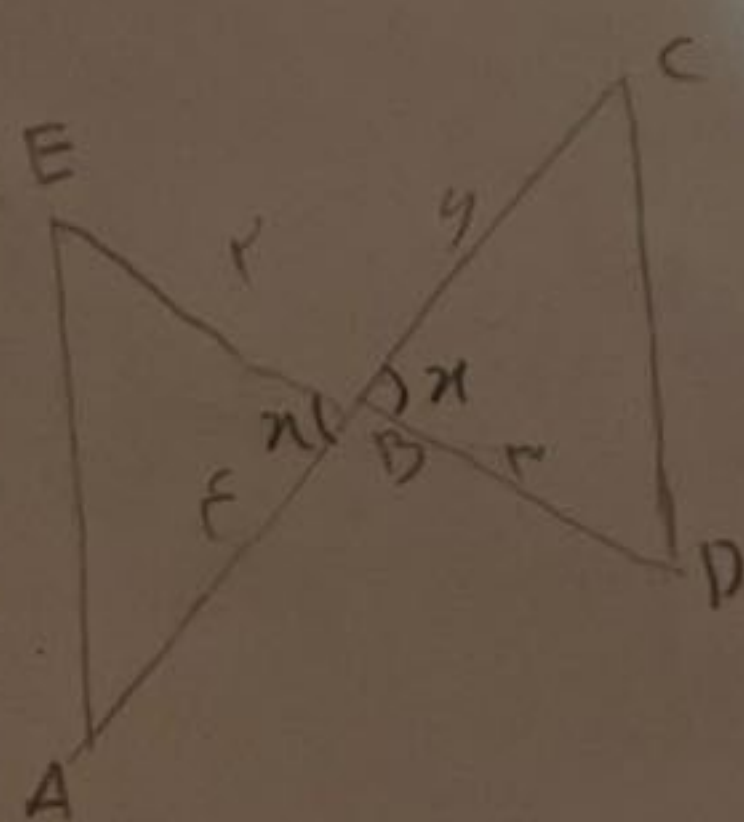
$$\sin 40^\circ = \frac{\sqrt{3}}{2} = \frac{CH}{BC} \Rightarrow \frac{CH}{BC} = \frac{\sqrt{3}}{2}$$

$$\frac{CH}{BC} = \frac{AC}{BC} = \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$$

$$\frac{CH}{AC} = \frac{CH}{BC} = \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$$

$$\frac{AH}{AC} = \frac{AH}{BC} = \frac{1}{2} = \frac{1}{2}$$

$$\frac{AH + BH}{AC} = \frac{\sqrt{3} + 1}{2}$$

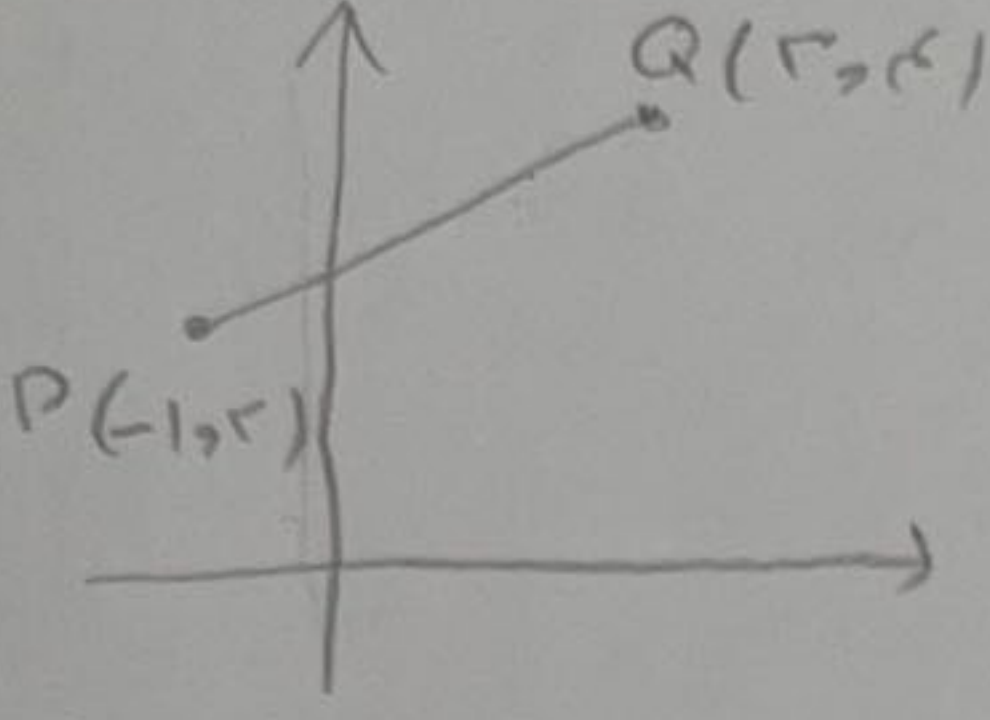
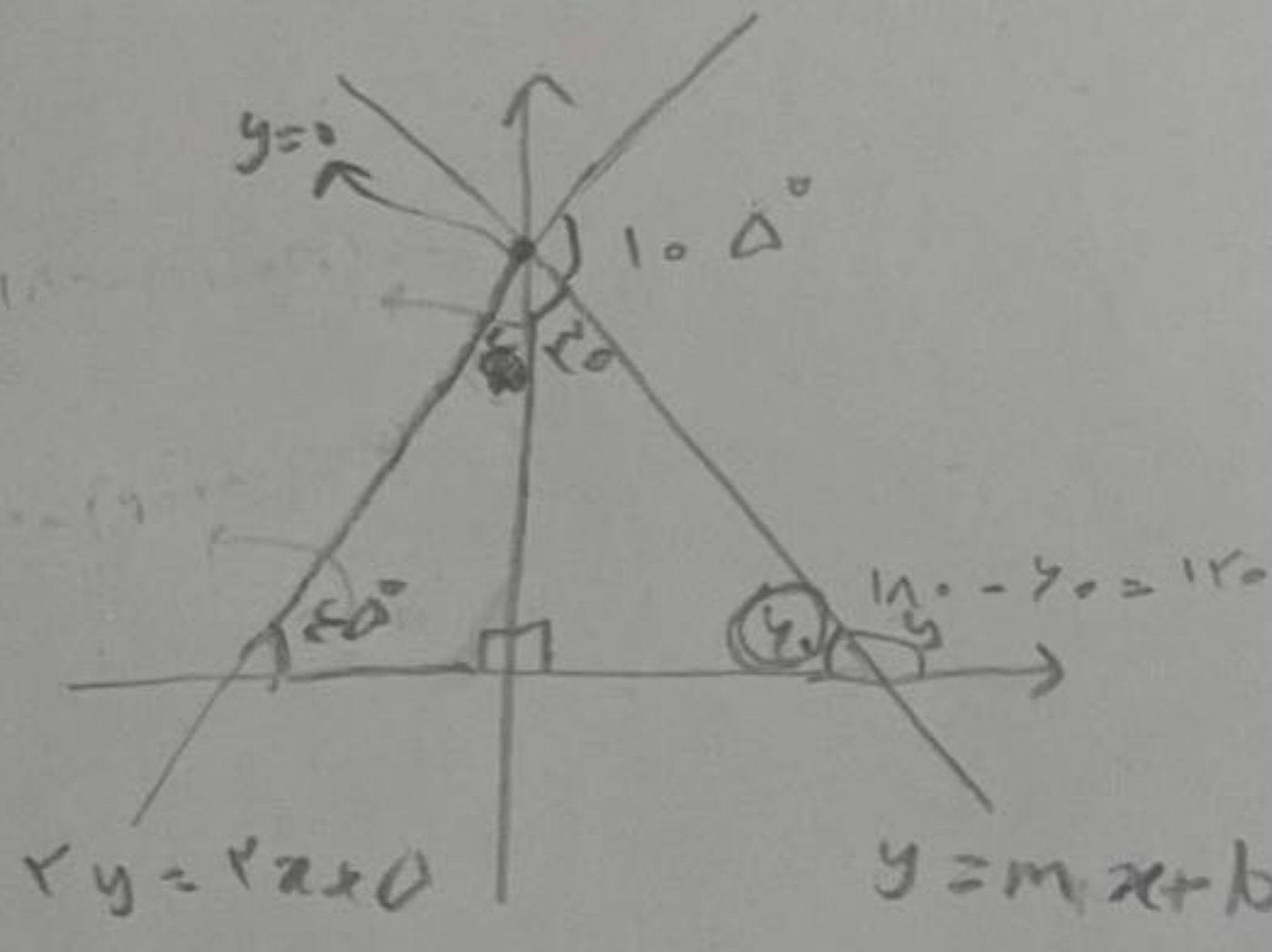


$$\frac{ABE}{BCD} = ?$$

$$S_{ABE} = \frac{1}{2} \times 2 \times 2 \times \sin x = 2 \sin x$$

$$S_{BCD} = \frac{1}{2} \times 2 \times 2 \times \sin x = 2 \sin x$$

$$\frac{2 \sin x}{2 \sin x} = \frac{2}{2}$$

(الف) $\frac{1}{r} \times r \times r \times \sin 120^\circ = 4 \times \sin 120^\circ = 2$ $4 \times \frac{\sqrt{3}}{2} = 2\sqrt{3}$ $\frac{1}{r} \times 2\sqrt{3} \times r = 2\sqrt{3}$ $r = 4$	(ب) $\frac{1}{r} \times r \times r \times \sin 120^\circ = 4 \times \sin 120^\circ = 2\sqrt{3}$ $r = 4$	6
	$\tan \theta = \frac{\Delta y}{\Delta x} = \frac{4-2}{2-(-1)} = \frac{2}{3}$ $1 + \tan^2 \theta = \frac{1}{\cos^2 \theta} \rightarrow 1 + \frac{4}{9} = \frac{1}{\cos^2 \theta} \rightarrow \cos^2 \theta = \frac{9}{13}$ $\cos \theta = \sqrt{\frac{9}{13}} = \frac{3\sqrt{13}}{13}$	7
	$2y = 2x + 4 \Rightarrow y = x + 2 \Rightarrow m_1 = 1$ $\tan 45^\circ = \sqrt{3} \Rightarrow m = -\tan 45^\circ = -1 \Rightarrow m_2 = -1$ $x_0 = 0 \Rightarrow y = \frac{0}{1} \Rightarrow b = \frac{0}{1}$ $m = -\frac{\sqrt{3}}{2}, b = \frac{0}{2} = 0$ $mb = -\frac{\sqrt{3}}{2} \times \frac{0}{2} = 0$	8
$f(x) = \cos(\pi + x) + \sin(\frac{\pi}{2} - x) - \tan(\frac{\pi}{4} + x)$ $f(\frac{5\pi}{4}) = ?$ $f(x) = -\cos x + \cos x - (-\cot x) = \cot x$ $f(\frac{5\pi}{4}) = f(135^\circ) = \cot(135^\circ) = \frac{-\sqrt{2}}{\frac{1}{\sqrt{2}}} = -\sqrt{2}$		9
$\frac{\sin(\frac{14\pi}{5} + x) + \cos(\frac{14\pi}{5} - x)}{\cos(2\pi + x) - \sin(2\pi - x)}$	$\frac{\cos x - \sin x}{-\cos x - (-\sin x)} = \frac{\cos x - \sin x}{-\cos x + \sin x} = -1$	10