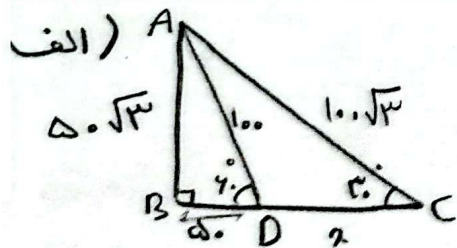
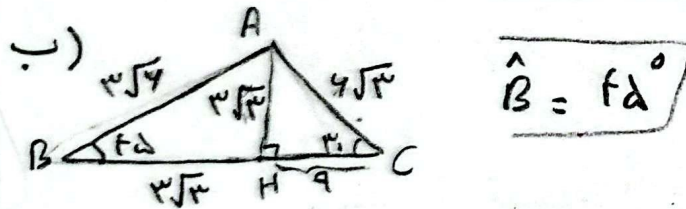
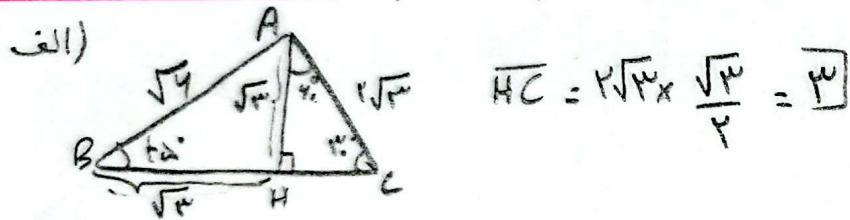


الف) $(\sin_{135^\circ} + \sin_{225^\circ})(\cos_{135^\circ} - \cos_{225^\circ}) = \left(\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}\right) = \frac{1}{2} - \frac{3}{4} = \boxed{\frac{-1}{4}}$

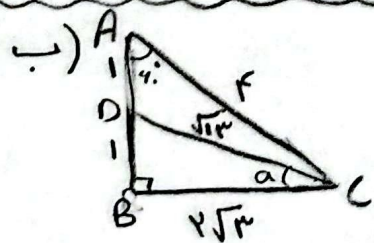
ب) $\frac{1 + 3\tan^2_{45^\circ}}{4\cos^2_{45^\circ} + 4\cos^2_{135^\circ}} = \frac{1 + 3\left(\frac{\sqrt{3}}{3}\right)^2}{4\left(\frac{\sqrt{3}}{2}\right)^2 + 4\left(\frac{-\sqrt{2}}{2}\right)^2} = \frac{1+1}{3+1} = \boxed{\frac{1}{4}}$



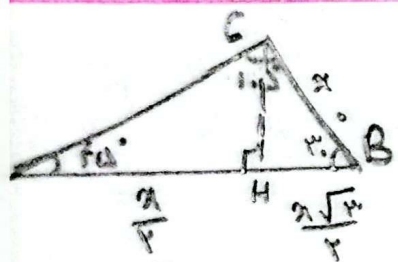
$$BC = 100\sqrt{3} \times \frac{\sqrt{3}}{2} = 150$$

$$BC = BD + DC = 50 + x = 150$$

$$\boxed{x = 100}$$



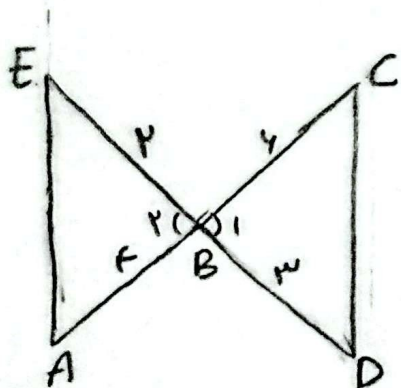
$$\sin_a = \frac{1}{\sqrt{13}} = \boxed{\frac{\sqrt{13}}{13}}$$



$$AC = \sqrt{\frac{2^2}{y^2} + y} = \frac{2}{y} \sqrt{y}$$

$$AB = \frac{2}{y} + \frac{2\sqrt{y}}{y} = \frac{2(1+\sqrt{y})}{y}$$

$$\left. \begin{array}{l} AC = \frac{2}{y} \sqrt{y} \\ AB = \frac{2(1+\sqrt{y})}{y} \end{array} \right\} \frac{AB}{AC} = \frac{2(1+\sqrt{y})}{y} \times \frac{y}{2\sqrt{y}} = \frac{1+\sqrt{y}}{\sqrt{y}}$$



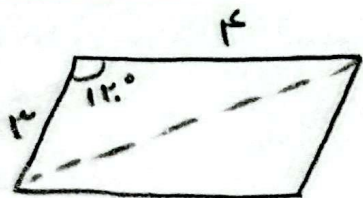
$$B_1 = B_2 \sim \sin B_1 = \sin B_2$$

$$S_{\triangle ABE} = \frac{1}{2} \times y \times f \times \sin B_2 = f \sin B_2$$

$$S_{\triangle CED} = \frac{1}{2} \times y \times w \times \sin B_1 = y \sin B_1$$

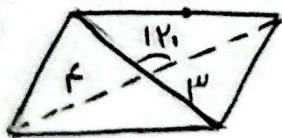
$$\left. \begin{array}{l} S_{\triangle ABE} = f \sin B_2 \\ S_{\triangle CED} = y \sin B_1 \end{array} \right\} \frac{S_{\triangle ABE}}{S_{\triangle CED}} = \frac{f \sin B_2}{y \sin B_1} = \frac{f}{y}$$

الف)

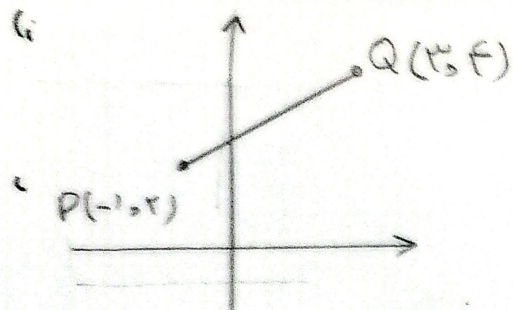


$$y \times \frac{1}{2} \times w \times \sin 120^\circ = 12 \times \frac{\sqrt{3}}{2} = 6\sqrt{3}$$

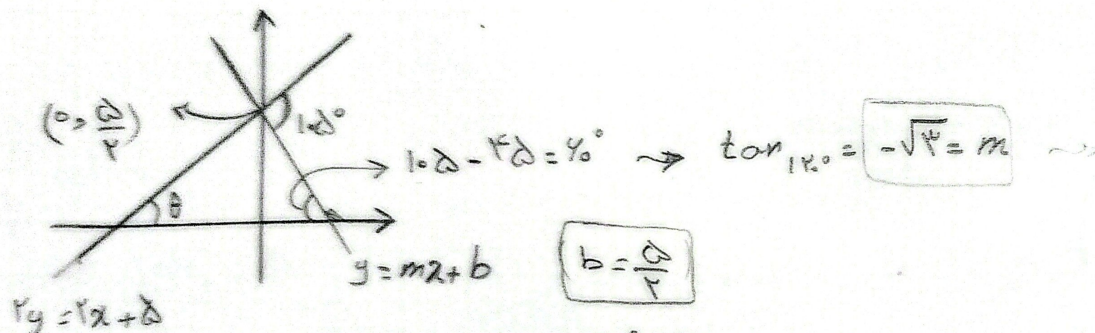
ب)



$$\frac{1}{2} \times y \times w \times \sin 120^\circ = 4 \sin 120^\circ = 3\sqrt{3}$$



$$a = \frac{5-2}{2-(-1)} = \frac{1}{3} \Rightarrow \tan \theta = \frac{1}{3} \Rightarrow \cos \theta = \sqrt{\frac{1}{1+\tan^2 \theta}} = \frac{3}{\sqrt{10}} = \frac{3\sqrt{10}}{10}$$



$$\Rightarrow mb = \frac{-\delta\sqrt{3}}{3}$$

$\hookrightarrow y = x + \frac{\delta}{3} \Rightarrow \tan \theta = 1 \Rightarrow \theta = 45^\circ \checkmark$

$\hookrightarrow \theta = 120^\circ$ (angle between lines)

$$f(x) = \cos(\pi + x) + \sin(\frac{\pi}{4} - x) - \tan(\frac{5\pi}{4} + x) = -\cos x + \cos x + \cot x = \cot x$$

$$f(\frac{\pi}{4}) = \cot_{45^\circ} = \boxed{-\sqrt{3}}$$

$$\frac{\sin(\frac{14\pi}{5} + x) + \cos(\frac{10\pi}{5} - x)}{\cos(\frac{4\pi}{5} + x) - \sin(\frac{4\pi}{5} - x)} = \frac{\cos x + \sin x}{-\cos x + \sin x}$$