

۱۹، ۷۵ افرین!

$$(\sin 135^\circ + \sin 30^\circ)(\cos 135^\circ - \cos 15^\circ)$$

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

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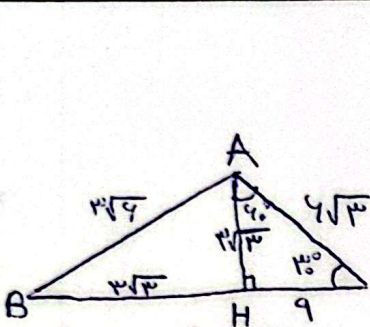
$$\frac{1 + 3 \tan^2 110^\circ}{\sec^2 110^\circ + 2 \cos^2 110^\circ} = \frac{1}{\sqrt{3}} \times \frac{1}{\sqrt{3}} = \frac{1}{3} \times 3 = 1 \Rightarrow 1 + 1 = 2$$

$$\frac{\sqrt{3}}{1} \times \frac{\sqrt{3}}{1} = 3 \times 1 = 3$$

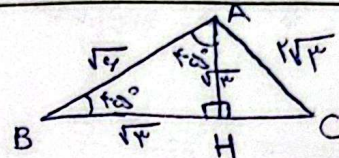
$$-\frac{\sqrt{2}}{2} \times \left(-\frac{\sqrt{2}}{2}\right) = \frac{2}{4} \Rightarrow 2 \times \frac{2}{4} = 1 \Rightarrow 3 + 1 = 4$$

(ب)

$$\frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$$



$$\begin{aligned} AH &= BH = \sqrt{3} \\ \sqrt{3} + \sqrt{3} &= \sqrt{12} \\ (3\sqrt{3})^2 &= (\sqrt{3})^2 + HC^2 \\ \Rightarrow HC &= \sqrt{9} = 3 \end{aligned}$$



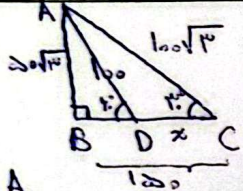
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$$\frac{\sqrt{3}}{2} \times 3 = 9 \Rightarrow 9 \times \frac{2}{\sqrt{3}} = \frac{18}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 6\sqrt{3}$$

$$AH^2 + 9^2 = (4\sqrt{3})^2 \Rightarrow AH = 3\sqrt{3}$$

$$(3\sqrt{3})^2 = (3\sqrt{3})^2 + BH^2 \Rightarrow BH = 3\sqrt{3} \Rightarrow BC = 6\sqrt{3}$$



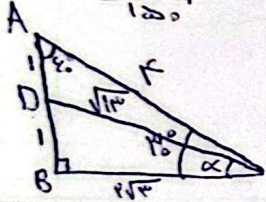
$$200\sqrt{3} \times 2 = 100\sqrt{3}$$

$$BC^2 + (200\sqrt{3})^2 = (100\sqrt{3})^2 \Rightarrow BC = \sqrt{22500} = 150$$

$$200\sqrt{3} \times \frac{2}{\sqrt{3}} = 100$$

$$BD^2 + (200\sqrt{3})^2 = 100^2 \Rightarrow BD = 200$$

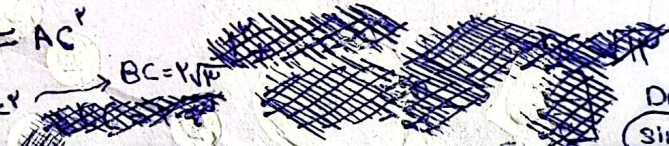
$$x = 150 - 50 = 100$$



$$AB^2 + BC^2 = AC^2$$

$$100^2 + 100^2 = 100^2$$

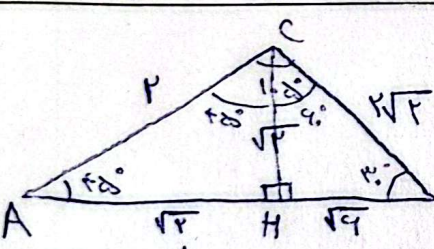
$$100^2 + 100^2 = 100^2$$



$$\begin{aligned} DC^2 &= 100^2 + (100\sqrt{3})^2 \\ DC &= \sqrt{10000 + 30000} = \sqrt{40000} = 200 \\ \sin \alpha &= \frac{1}{\sqrt{3}} \end{aligned}$$

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$$\sin 60^\circ = \frac{\sqrt{3}}{2}$$

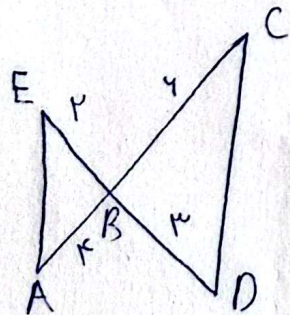
$$\sin 30^\circ = \frac{1}{2}$$

$$\frac{1}{2} = \frac{\sqrt{3}}{2\sqrt{3}} \Rightarrow BC = 2\sqrt{3}$$

$$\begin{aligned} HB^2 + (\sqrt{3})^2 &= (2\sqrt{3})^2 \Rightarrow HB = \sqrt{11} \\ AH &= \sqrt{3} \\ \frac{AB}{AC} &= \frac{\sqrt{3+11}}{2} \end{aligned}$$

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$$\frac{\frac{1}{2} \times 2 \times 2 \times \sin B}{\frac{1}{2} \times 3 \times 3 \times \sin B} = \frac{4}{9}$$

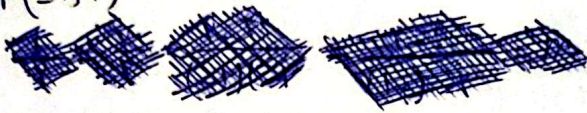
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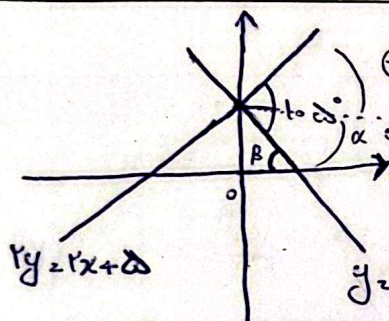
الف) $\frac{1}{\sqrt{3}} \times \sqrt{3} \times \sqrt{3} \times \sin 120^\circ = \frac{1}{\sqrt{3}} \times \sqrt{3} \times \sqrt{3} \times \frac{\sqrt{3}}{2} = \frac{3\sqrt{3}}{2} = 3\sqrt{3} \Rightarrow 3\sqrt{3} \times 2 = \boxed{6\sqrt{3}}$ ✓
 $S = \frac{1}{\sqrt{3}} ab \sin \alpha$
 ب) $S = \frac{1}{\sqrt{3}} ab \sin \alpha \Rightarrow \frac{1}{\sqrt{3}} \times \sqrt{3} \times \sqrt{3} \times \frac{\sqrt{3}}{2} = \boxed{3\sqrt{3}}$ ✓

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$Q(3, 4), P(-1, 2)$

سبب خط:  $\frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 2}{3 - (-1)} = \frac{2}{4} = \frac{1}{2}$ ✓
 $\tan \theta = \frac{1}{2}$
 $\cos \theta = \frac{1}{\sqrt{\tan^2 \theta + 1}} = \frac{1}{\sqrt{\frac{1}{4} + 1}} = \frac{2}{\sqrt{5}}$ ✓

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$\theta = 45^\circ \quad \theta + \alpha = 135^\circ$

$2y = 2x + 2 \Rightarrow y = x + 1$

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

$135^\circ - 45^\circ = 90^\circ$

$\alpha = \beta \Rightarrow \beta = 45^\circ \Rightarrow \tan 45^\circ = \sqrt{3}$ سبب خطية

نقطة $(0, 2)$

$2, 1 = \sqrt{3}(0) + b \Rightarrow b = 2, 1$

$mb = 2, 1 \sqrt{3}$

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

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$f(\frac{\pi}{4}) = f(135^\circ)$

$\cot 135^\circ = \frac{-\frac{\sqrt{3}}{2}}{\frac{1}{2}} = -\frac{\sqrt{3}}{1} = \boxed{-\sqrt{3}}$ ✓

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$\frac{\sin(\frac{14\pi}{5} + x) + \cos(\frac{12\pi}{5} - x)}{\cos(7\pi + x) - \sin(4\pi - x)} = \frac{\cos x + (-\sin x)}{-\cos x + \sin x}$
 $= \frac{\cos x - \sin x}{-\cos x + \sin x} = \frac{\cos x - \sin x}{-(\cos x - \sin x)} = \boxed{-1}$ ✓

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