یسنا ترافانی — تکلیف شماره ۲۰ — پنجشنبه دختران C

①

الف) $(\sin 135 + \sin 300)(\cos 315 - \cos 150)$

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

ب) $$\frac{1 + 3\tan^2 210}{4\cos^2 330 + 2\cos^2 225} = \frac{1 + 3\left(\frac{\sqrt{3}}{3}\right)^2}{\left(4\times\left(\frac{\sqrt{3}}{2}\right)^2\right) + \left(2\times\left(-\frac{\sqrt{2}}{2}\right)^2\right)} = \frac{1+1}{3+1} = \frac{2}{4} = \boxed{\frac{1}{2}}$$

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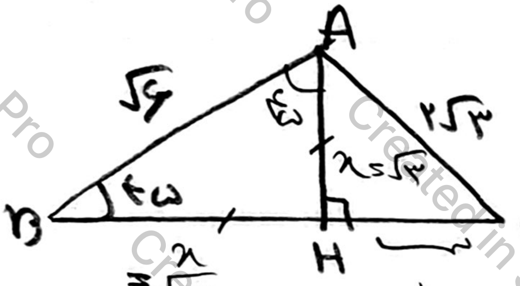
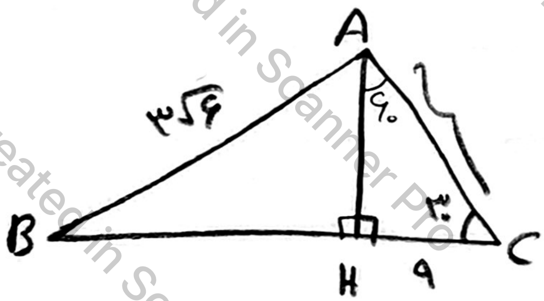
②



$\sqrt{6} = \sqrt{2} \times x \rightarrow x = \sqrt{3}$

$$AH = \frac{\sqrt{2}}{2} \times \sqrt{6} = \frac{\cancel{2}\sqrt{3}}{\cancel{2}} = \sqrt{3}$$

$$HC = \sqrt{12 - 3} = \sqrt{9} = \boxed{3}$$



$$\frac{\sqrt{3}}{2} \times AC = 9 \rightarrow AC = \cancel{9}^{3\sqrt{3}} \times \frac{2}{\cancel{\sqrt{3}}} = \boxed{6\sqrt{3}}$$

$$\frac{BC}{\sin A} = \frac{AC}{\sin B} = \frac{AB}{\sin C}$$

$$\frac{6\sqrt{3}}{\sin B} = \frac{3\sqrt{6}}{\frac{\cancel{\sin 30}}{\frac{1}{2}}} \rightarrow \sin B$$

$\boxed{135 \text{ یا } 45}$

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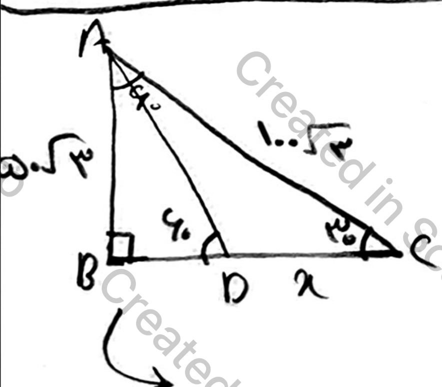
③

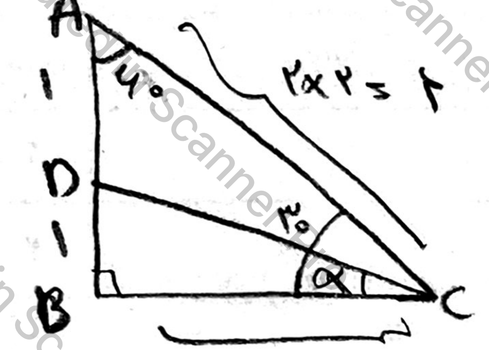


$AB \times \frac{1}{2} = 50\sqrt{3}$ $\quad D = 120 ,\ C = 30$

$AB = 100\sqrt{3}$ $\quad \rightarrow A = 30 \rightarrow \boxed{DC = AD = 100}$

$$AD = \frac{\frac{50\sqrt{3}}{1}}{\frac{\sqrt{3}}{2}} = \frac{100\sqrt{3}}{\sqrt{3}} = 100$$

ب)



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

$$2\times 2 = 4$$

$$\frac{\sqrt{3}}{2}\times 4 = 2\sqrt{3} \qquad \frac{1}{2\sqrt{3}}$$

$$DC^2 = (2\sqrt{3})^2 + (1)^2 = 13 \rightarrow DC = \sqrt{13}$$

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$$\frac{AB}{\sin 105^\circ} = \frac{BC}{\sin 45} = \frac{CA}{\sin 30} \rightarrow 2\,CA \times \sin 105 = AB$$

$$\rightarrow \frac{2\cancel{AC}\times \sin 105}{\cancel{AC}} = 2\sin 105^\circ$$

$$\sin^2 105 = \frac{2+\sqrt{3}}{4}$$

$$\boxed{4\sin = \sqrt{2+\sqrt{3}}}$$

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$$\left.\begin{aligned} S_{ABE} &= \frac{1}{2}\, EB\times BA\times \sin B_1 \\ S_{BCD} &= \frac{1}{2}\, BC\times BD\times \sin B_2 \end{aligned}\right\} \rightarrow \frac{8}{18} = \boxed{\frac{4}{9}}$$

$$B_1 = B_2$$

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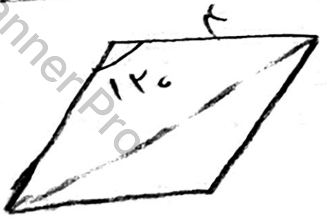
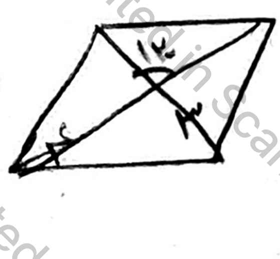


$$S = \frac{1}{2}\times 4\times 3\times \underbrace{\sin 120}_{\frac{\sqrt{3}}{2}}\times 2 = \boxed{6\sqrt{3}}$$

۲ مثلث

الف)

ب)



$$S = \frac{1}{2}\times 3\times 4\times \underbrace{\sin 120}_{\frac{\sqrt{3}}{2}} = \boxed{3\sqrt{3}}$$

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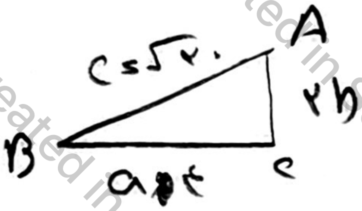

$\rightarrow 2^2+4^2=4+16=\sqrt{20}$ وتر

$$\frac{a}{\sin A}=\frac{b}{\sin B}\rightarrow\frac{4}{\sin x}=\frac{2}{\sin(90-x)}$$

$\rightarrow 2\sin(90-x)=\sin x$

$a: \tan\theta=\frac{4-2}{3+1}=\frac{1}{2}\ ,\ b+\frac{3}{2}=4\rightarrow b=\frac{5}{2}$

$y=\frac{1}{2}x+\frac{5}{2}$

$0=\frac{1}{2}x+\frac{5}{2}$

$\frac{1}{2}x=-\frac{5}{2}$

$\boxed{x=-5}$

$8^2+4^2=\sqrt{80}$ وتر

$2\sqrt{20}=4\sqrt{5}$

$$\cos\theta=\frac{8}{4\sqrt{5}}=\frac{2}{\sqrt{5}}\times\frac{\sqrt{5}}{\sqrt{5}}=\frac{2\sqrt{5}}{5}$$

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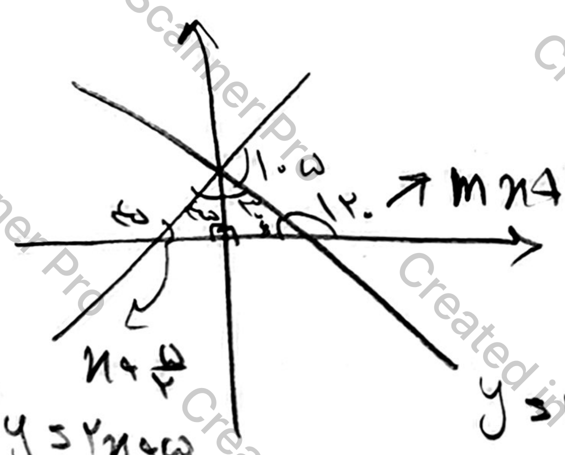

$\rightarrow mx+b$ شیب خط

$2y=2x+5\rightarrow m=1$

$\tan\theta=1\rightarrow\theta=45$

$y=mx+b\rightarrow m=\tan 120=-\sqrt{3}$

$\left|\begin{matrix}0\\ \frac{5}{2}\end{matrix}\right.\rightarrow\frac{5}{2}=-\sqrt{3}(0)+b\rightarrow b=\frac{5}{2}$

$mb=-\sqrt{3}\times\frac{5}{2}=\frac{-5\sqrt{3}}{2}$

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$$f(x) = \cos(\pi + x) + \sin\left(\frac{\pi}{2} - x\right) - \tan\left(\frac{3\pi}{2} + x\right) = -\cos x + \cos x + \cot x = \cot x \to \cot 150 = \boxed{-\sqrt{3}}$$

$$\frac{5\pi}{6} = 150$$

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$$\frac{\sin\left(\frac{17\pi}{2} + x\right) + \cos\left(\frac{15\pi}{2} - x\right)}{\cos(3\pi + x) - \sin(6\pi + x)}$$

$$= \frac{\sin\left(\frac{\pi}{2} + 8\pi + x\right) + \cos\left(\frac{3\pi}{2} + 6\pi - x\right)}{\cos(2\pi + \pi + x) - \sin(6\pi - x)}$$

$$= \frac{\cos x - \sin x}{-\cos x + \sin x} = \boxed{-1}$$