نام و نام خانوادگی اسنا فاضلی — تکلیف ۲۵ — دهم جمعه ها

۲۵

۱- الف)
$$\underbrace{\left(\frac{\sqrt2}{2}-\frac{\sqrt3}{2}\right)\left(\frac{\sqrt2}{2}-\left(-\frac{\sqrt3}{2}\right)\right)}_{\text{اتحاد مزدوج}}=\frac{2}{4}-\frac{3}{4}=-\frac14$$

ب)
$$\frac{1+3\times\cancel{\left(-\frac{1}{\sqrt3}\right)^2}^{\frac13}}{4\times\cancel{\left(\frac{\sqrt3}{2}\right)^2}_{\frac34}+2\times\cancel{\left(-\frac{\sqrt2}{2}\right)^2}_{\frac12}}=\frac{1+1}{3+1}=\frac12$$

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۲- الف)
$$\frac{\sqrt6}{\sin C}=\frac{2\sqrt3}{\cancel{\sin45}_{\frac{\sqrt2}{2}}}=\frac{4\sqrt3}{\sqrt2}\to \cancel{4\sqrt3}^{2}\sin C=\frac{\cancel{\sqrt2\times\sqrt6}}{\cancel{2}}_{\sqrt{12}}$$
$$\downarrow$$
$$\sin C=\frac12 \quad \cancel{2\sqrt3}$$

$$\to C=30^\circ$$
$$\frac{\sqrt3}{\cancel2}\times\cancel2\sqrt3=3\to CH=3$$

ب)
$$9\times\frac{2}{\sqrt3}=\frac{18}{\sqrt3}=\text{وتر}=AC$$
$$\frac{\frac{18}{\sqrt3}}{\sin B}=\frac{3\sqrt6}{\underset{\sin30^\circ}{\frac12}}\to\frac{\cancel{18}^{9}}{\sqrt3}\times\frac{1}{\cancel2}=3\sqrt6\times\sin B$$
$$\frac{9}{\sqrt3}=3\sqrt6\times\sin B\to\frac{9}{\sqrt3}\times\frac{1}{3\sqrt6}=\frac{9}{3\sqrt{18}}\to\frac{3\times\sqrt{18}}{\sqrt{18}\times\sqrt{18}}=\frac{3\sqrt{18}}{\cancel{18}_{6}}$$
$$\to\frac{\cancel{3}\sqrt2}{\cancel{6}_{2}}\to\frac{\sqrt2}{2}=\sin45^\circ$$

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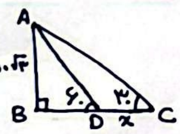
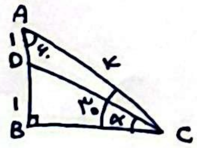
۳- الف)



$$BD=AD^2-AB^2\to100^2-(50\sqrt3)^2=2500\to BD=50$$
$$AD\Rightarrow\frac{50\sqrt3}{\text{وتر}}=\frac{\sqrt3}{2}\to AD=100$$
$$DC=CB-DB$$
$$AC\Rightarrow\frac{50\sqrt3}{\text{وتر}}=\frac12\to\text{وتر}=100\sqrt3$$
$$(50\sqrt3)^2+BC^2=(100\sqrt3)^2\to7500+BC^2=30000\to BC^2=22500\to BC=150$$
$$DC=150-50=\boxed{100}$$

ب)



$$\frac{\cancel{AB}^{2}}{AC}=\frac12\to AC=4$$
$$(4^2)-(2)^2=12\to BC=\sqrt{12}$$
$$B\hat DC\to(1)^2+(\sqrt{12})^2=13\to DC=\sqrt{13}$$
$$\sin\alpha=\frac{1}{\sqrt{13}}=\frac{\sqrt{13}}{13}$$

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۴- قضیه سینوس‌ها
$$\to\frac{AB}{\sin105^\circ}=\frac{AC}{\sin30^\circ}\to\frac{\cancel4^{2}AB}{\sqrt2+\sqrt6}=\cancel2AC\to\frac{AB}{AC}=\frac{AB}{\frac{2AB}{\sqrt2+\sqrt6}}=\frac{\sqrt6+\sqrt2}{2ab}\times ab=\boxed{\frac{\sqrt6+\sqrt2}{2}}$$
$$\sin105^\circ=\sin(45^\circ+60^\circ)=\underset{\frac{\sqrt2}{2}\times\frac12}{\sin45\times\cos60}+\cancel{\sin60\times\cos45}=\frac{\sqrt2}{4}+\frac{\sqrt6}{4}=\frac{\sqrt2+\sqrt6}{4}$$

۵-

$$\frac{S_{A\hat{B}E}}{S_{B\hat{D}C}} = \frac{\cancel{\frac{1}{2}} \times \cancel{\sin B_1} \times 2 \times 4}{\cancel{\frac{1}{2}} \times \cancel{\sin B_2} \times 3 \times 6} = \frac{8}{18} = \frac{4}{9}$$

$B_1$ و $B_2 \rightarrow$ متقابل به رأس

۶-

الف) $3 \times \cancel{4}^{2} \times \frac{\sin 120^\circ}{\frac{\sqrt{3}}{\cancel{2}}} = 6\sqrt{3}$

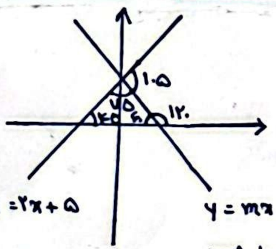
ب) $\frac{1}{\cancel{2}} \times \cancel{\sin 120^\circ}^{\frac{\sqrt{3}}{2}} \times 3 \times \cancel{4} = 3\sqrt{3}$

۷-

$$\text{شیب} = \frac{\Delta y}{\Delta x} = \frac{4-2}{3-(-1)} = \frac{2}{4} = \frac{1}{2}$$

$$\tan\alpha = \frac{1}{2} \qquad \underbrace{1 + \cancel{\tan^2\alpha}^{\frac{1}{4}}}_{\frac{5}{4}} = \frac{1}{\cos^2\alpha} \longrightarrow \cos^2\alpha = \frac{4}{5} \longrightarrow \cos\alpha = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$$

۸-




$2y = 2x + 5$

$\downarrow$

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

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

$\tan\alpha = 1$

$\rightarrow \alpha = 45^\circ$

$y = mx + b$

$\rightarrow b = \frac{5}{2}$

$m = \tan 120^\circ = \frac{\frac{\sqrt{3}}{2}}{\frac{-1}{2}} = -\sqrt{3}$

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

۹-

$$f\left(\frac{5\pi}{6}\right) = \cos\left(\pi + \frac{5\pi}{6}\right) + \sin\left(\frac{\pi}{2} - \frac{5\pi}{6}\right) - \tan\left(\frac{3\pi}{2} + \frac{5\pi}{6}\right)$$

$$\cancel{\left(\cos\frac{5\pi}{6}\right) + \left(-\cos\frac{5\pi}{6}\right)} - \left(\cot\frac{5\pi}{6}\right) = -(-\sqrt{3}) = \sqrt{3}$$

۱۰-

$$\frac{\sin\left(\frac{\pi}{2} + x\right) + \cos\left(\frac{3\pi}{2} - x\right)}{\cos(\pi + x) - \sin(2\pi - x)} = \frac{+\cos x + (-\sin x)}{-\cos x + \sin x} = -1$$