کلاس دهم رضی A — حل تمامی — با سجاد تکلیف شماره ۲۵

۱) الف) $\left(\frac{\sqrt{۲}}{۲}-\frac{\sqrt{۳}}{۲}\right)\left(\frac{\sqrt{۲}}{۲}+\frac{\sqrt{۳}}{۲}\right)=\frac{۲}{۴}-\frac{۳}{۴}=-\frac{۱}{۴}$

ب) $\frac{۱+۳\left(\frac{\sqrt{۳}}{۳}\right)^{۲}}{۴\left(\frac{\sqrt{۲}}{۲}\right)^{۲}+۲\left(-\frac{\sqrt{۲}}{۲}\right)^{۲}}=\frac{۱+۳\times\frac{۳}{۹}}{۴\times\frac{۲}{۴}+۲\times\frac{۱}{۴}}=\frac{۲}{۴}=\frac{۱}{۲}$

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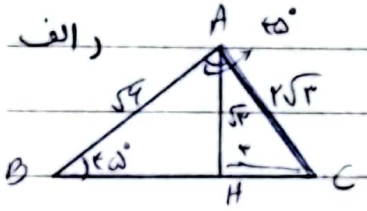
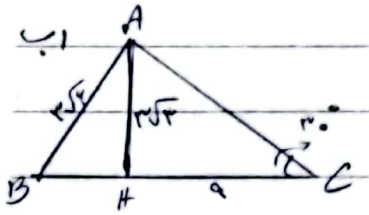
۲) الف)



$۶\times\frac{\sqrt{۲}}{۲}=\frac{\sqrt{۱۲}}{۲}=\frac{۲\sqrt{۳}}{۲}=\sqrt{۳}$

$(\sqrt{۳})^{۲}+(HC)^{۲}=(۲\sqrt{۳})^{۲}\Rightarrow(HC)^{۲}=۹\Rightarrow HC=۳$

ب)



$\tan\alpha=\frac{\text{مقابل}}{\text{مجاور}}\Rightarrow\tan۳۰^{\circ}=\frac{\sqrt{۳}}{۳}=\frac{AH}{۹}\Rightarrow AH=۳\sqrt{۳}$

$\sin B=\frac{۳\sqrt{۳}}{۳\sqrt{۶}}=\frac{\sqrt{۳}\times\sqrt{۶}}{\sqrt{۶}\times\sqrt{۹}}=\frac{\sqrt{۱۸}}{۶}=\frac{۳\sqrt{۲}}{۶}=\frac{\sqrt{۲}}{۲}\Rightarrow\sin B=\frac{\sqrt{۲}}{۲}$

$\Rightarrow B=۴۵^{\circ}$ یا ۱۳۵°

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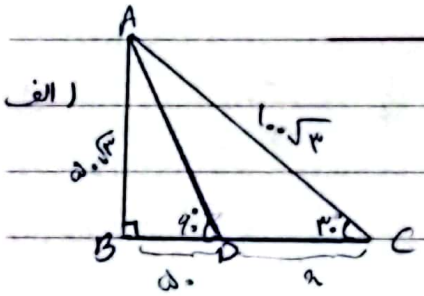
۳) الف)



$\frac{۵۰\sqrt{۳}}{AC}=\frac{۱}{۲}\Rightarrow AC=۱۰۰\sqrt{۳}$

$\frac{۵۰\sqrt{۳}}{BD}=\sqrt{۳}\Rightarrow BD=۵۰$

$(۵۰\sqrt{۳})^{۲}+(BC)^{۲}=(۱۰۰\sqrt{۳})^{۲}$

$۷۵۰۰+(BC)^{۲}=۳۰۰۰۰$

$۲۲۵۰۰\Rightarrow BC=۱۵۰$

$BC=BD+x\rightarrow ۱۵۰=۵۰+x$

$x=۱۰۰$

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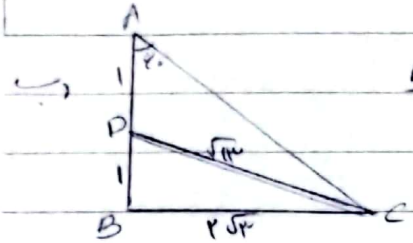
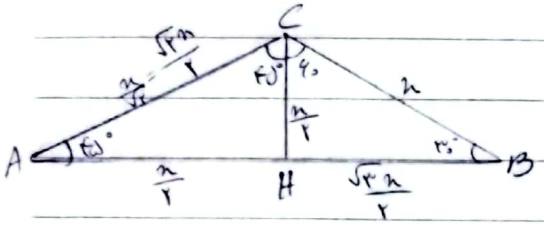


$$\frac{BC}{۲} = \sqrt{۳} = \tan ۶۰^\circ \rightarrow BC = ۲\sqrt{۳}$$

$$DC^۲ = ۱ + (۲\sqrt{۳})^۲ = ۱۳ \rightarrow DC = \sqrt{۱۳}$$

$$\sin\alpha = \frac{۱}{\sqrt{۱۳}} = \frac{\sqrt{۱۳}}{۱۳}$$

۱۴



$$\frac{\frac{x}{۲} + \frac{\sqrt{۳}x}{۲}}{\frac{\sqrt{۳}x}{۲}} = \frac{x(\sqrt{۳}+۱)}{x(\sqrt{۳})} = \frac{\sqrt{۳}+۱}{\sqrt{۳}} \times \frac{\sqrt{۳}}{\sqrt{۳}} =$$

$$\frac{\sqrt{۶}+\sqrt{۲}}{۴}$$

$$\sin ۶۰^\circ = \frac{\sqrt{۳}}{۲} \quad \sin ۳۰^\circ = \frac{۱}{۲} = \frac{CH}{x} \rightarrow CH = \frac{۱}{۲}x \quad , \quad x \times \frac{\sqrt{۳}}{۲} = \frac{\sqrt{۳}x}{۲}$$

$$\frac{\sqrt{۳}}{۲} AC = \frac{x}{۲} \rightarrow AC = \frac{\sqrt{۳}x}{۲}$$

۱۵

$$\frac{\frac{۱}{۲} \times ۲ \times ۴ \times \sin\alpha}{\frac{۱}{۲} \times ۳ \times ۶ \times \sin\alpha} = \frac{۴}{۹}$$

۱۶

الف) $S = ab\sin ۱۲۰^\circ \rightarrow ۳ \times ۴ \times \frac{\sqrt{۳}}{۲} = ۶\sqrt{۳}$

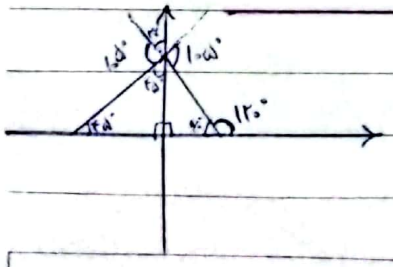
۱۹

ب) $S = \frac{۱}{۲} \times ab \times \sin ۱۲۰^\circ \rightarrow ۳ \times ۴ \times \frac{\sqrt{۳}}{۲} \times \frac{۱}{۲} = ۳\sqrt{۳}$

$$\tan\theta = \frac{۴-۲}{۳+۱} = \frac{۱}{۲} \qquad ۱ + \tan^۲\theta = \frac{۱}{\cos^۲\theta} \Rightarrow ۱ + \frac{۱}{۴} = \frac{۵}{۴}$$

۱۷

$$\Rightarrow \cos^۲\theta = \frac{۴}{۵} \rightarrow \cos\theta = \frac{۲}{\sqrt{۵}} = \frac{۲\sqrt{۵}}{۵}$$



۱۸

$$\begin{cases} y = \sqrt{۳}x + b \rightarrow b = \frac{۵}{۲} \\ y = x + \frac{۵}{۲} \end{cases}$$

$$۲y = mx + ۵ \qquad y = mx + b$$

$$y = x + \frac{۵}{۲}, \quad \tan ۴۵^\circ = ۱ \Rightarrow m = \tan ۱۲۰^\circ = -\sqrt{۳}$$

$$mb = \frac{۵}{۲} \times -\sqrt{۳} = \frac{-۵\sqrt{۳}}{۲}$$

LINE NOTE

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$$f(x) = -\cos(x) + \cos(x) - (-\cot(x)) \Rightarrow f(x) = \cot(x)$$

$$f\left(\frac{\pi}{4}\right) = \cot\left(\frac{\pi}{4}\right) = -\sqrt{1}$$

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