Date:

★ آفرین (ツ) ۱۹٫۵

یلدا انوری _ دهم «B»

سؤال ۱:

الف) $(\sin 135^\circ + \sin 300^\circ)(\cos 315^\circ - \cos 150^\circ) = \left[\frac{\sqrt{2}}{2} + \left(-\frac{\sqrt{3}}{2}\right)\right]\left[\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}\right] = \frac{2}{4} - \frac{3}{4} = \frac{-1}{4}$

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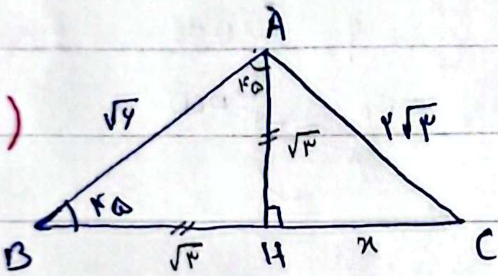
ب) $\frac{1 + 3\tan^2 210^\circ}{4\cos^2 330^\circ + 2\cos^2 225^\circ} = \frac{1 + 3 \times \frac{3}{9}}{4 \times \frac{3}{4} + 2 \times \frac{2}{4}} = \frac{1+1}{3+1} = \frac{2}{4} = \frac{1}{2}$

سؤال ۲: طول HC = ؟

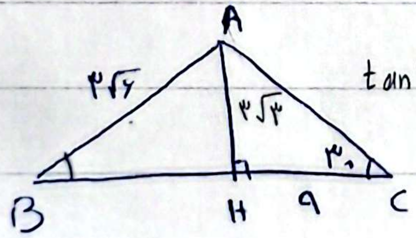
الف)



$AH = BH \rightarrow 2AH^2 = 6 \rightarrow AH = \sqrt{3}$

$x^2 + 3 = 12 \rightarrow x = 3$

ب)



$\tan 30^\circ : \frac{AH}{9} = \frac{\sqrt{3}}{3} \rightarrow AH = 3\sqrt{3}$

$\sin B = \frac{3\sqrt{3}}{3\sqrt{6}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \rightarrow B = 45^\circ$

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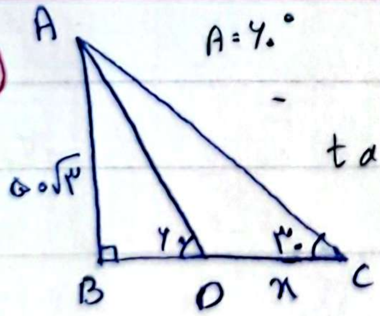
سؤال ۳:

الف)



$A = 60^\circ$

$\tan \underset{60}{A} = \frac{BC}{50\sqrt{3}} = \frac{\sqrt{3}}{1} \rightarrow BC = 150$

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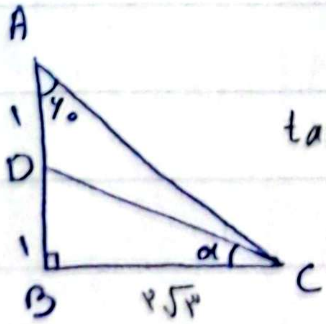
$A\hat{B}D : \tan \underset{60}{D} = \frac{50\sqrt{3}}{BD} = \frac{\sqrt{3}}{1} \rightarrow BD = 50 \Rightarrow x = 150 - 50 = 100$

ب)



$\tan \underset{60}{A} = \frac{BC}{2} = \sqrt{3} \rightarrow BC = 2\sqrt{3} \rightarrow DC^2 = 12 + 1 = 13 \rightarrow DC = \sqrt{13}$

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

Scbd

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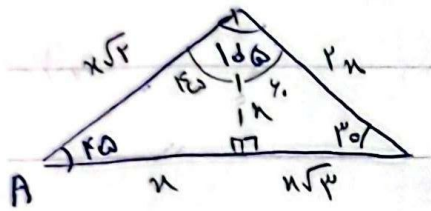
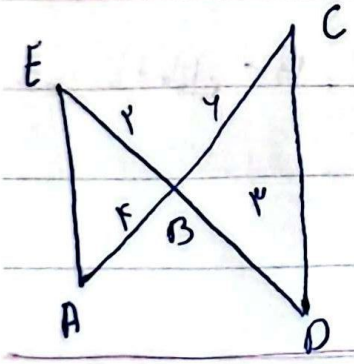
سؤال ۴:



$S_{ABC} = \frac{1}{2} \cdot AB \cdot AC \cdot \sin 45 = \frac{1}{2} \cdot AC \cdot BC \cdot \sin 105 = \frac{1}{2} \cdot BC \cdot AB \cdot \sin 30$

$AB = x(1+\sqrt{3}) \quad AC = x\sqrt{2} \quad \Rightarrow \quad \frac{AB}{AC} = \frac{x(1+\sqrt{3})}{x\sqrt{2}} = \frac{(1+\sqrt{3})\sqrt{2}}{2} = \frac{\sqrt{2}+\sqrt{6}}{2}$

سؤال ۵:



$\frac{S_{ABE}}{S_{BCD}} = \frac{\frac{1}{2} \times 2 \times 4 \times \sin B}{\frac{1}{2} \times 4 \times 3 \times \sin B} = \frac{8}{18} = \frac{4}{9}$

سؤال ۶:

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

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

سؤال ۷:

$y = ax + b$

$Q: \begin{pmatrix} 3 \\ 4 \end{pmatrix} \rightarrow 4 = 3a + b$

$P: \begin{pmatrix} -1 \\ 2 \end{pmatrix} \rightarrow 2 = -a + b$

$2 = 4a \rightarrow a = \frac{1}{2}$

$\tan\theta = \frac{1}{2} \rightarrow 1 + \tan^2\theta = \frac{1}{\cos^2\theta} \rightarrow 1 + \frac{1}{4} = \frac{5}{4}$

$\cos\theta = \pm \frac{2\sqrt{5}}{5}$ زاویه تند $\rightarrow \frac{2\sqrt{5}}{5}$

$\tan\theta = \frac{-1}{2} \rightarrow 1 + \tan^2\theta = \frac{1}{\cos^2\theta} = 1 + \frac{1}{4} = \frac{5}{4} \rightarrow \cos\theta = \pm \frac{2\sqrt{5}}{5} \rightarrow +\frac{2\sqrt{5}}{5}$

θ حاده است!

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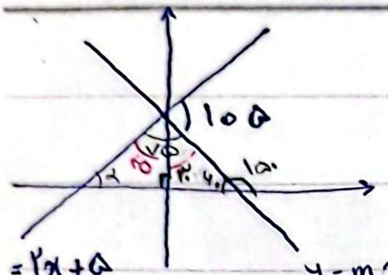
سوال ۸ :



$b = \frac{۵}{۲}$

$۲y = ۲x + ۵$

$y = mx + b \rightarrow m = \tan ۱۲۰^\circ = -\sqrt{۳}$

$y = x + \frac{۵}{۲}$ → $b = \frac{۵}{۲}$ $\rightarrow \tan\alpha = ۱ \rightarrow \alpha = ۴۵$

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

۲

سوال ۹ :

$f(x) = \cos(\pi + x) + \sin(\frac{\pi}{۲} - x) - \tan(\frac{۳\pi}{۲} + x)$ $\quad f(\frac{۵\pi}{۴}) = ?$

۱٫۷۵

$f(\frac{۵\pi}{۴}) = \cos(\frac{۵\pi}{۴} + \pi) + \sin(\frac{\pi}{۲} - \frac{۵\pi}{۴}) - \tan(\frac{۳\pi}{۲} + \frac{۵\pi}{۴}) =$

$= \cos(\frac{۵\pi}{۴}) - \cos(\frac{۵\pi}{۴}) + \cot(\frac{۵\pi}{۴}) = + \cot(\frac{۵\pi}{۴}) = + \cot(۱۵۰^\circ) = \sqrt{۳}$ $\quad -\sqrt{۳}$

سوال ۱۰ :

$\frac{\sin(\frac{۱۷\pi}{۲} + x) + \cos(\frac{۱۵\pi}{۲} - x)}{\cos(۳\pi + x) - \sin(۴\pi - x)} = \frac{\cos(x) - \sin(x)}{-\cos(x) + \sin(x)} =$

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$= \frac{-(\sin(x) - \cos(x))}{\sin(x) - \cos(x)} = -۱$ ✓

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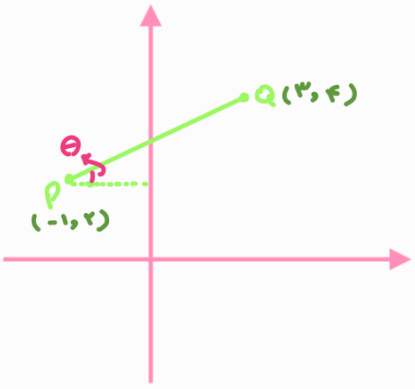

$m_{PQ} = \frac{۴-۲}{۳-(-۱)} = \frac{۱}{۲} = \tan\theta \rightarrow ۱+\tan^۲\theta = \frac{۱}{\cos^۲\theta}$

$۱+\frac{۱}{۴} = \frac{۱}{\cos^۲\theta} \rightarrow \cos^۲\theta = \frac{۴}{۵} \xrightarrow[\cos\theta>۰]{\text{در ناحیه اول}} \cos\theta = \frac{۲}{\sqrt{۵}} = \frac{۲\sqrt{۵}}{۵}$

۹

$$\underbrace{(\pi+x)}_{-\cos x} + \underbrace{\sin\left(\frac{\pi}{۲}-x\right)}_{\cos x} - \tan\left(\frac{۳\pi}{۲}+x\right)_{+\cot x}$$

$f(x) = \cot x \rightarrow f\left(\frac{۳\pi}{۴}\right) = \cot\left(\frac{۳\pi}{۴}\right) = -\sqrt{۳}$