تالیف ۲۰ کلاس یازدهم ریاضی B-۳۰ دبیرستان [illegible]

۱۹٫۵

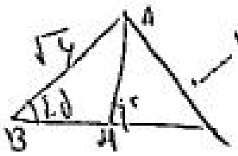
آفرین (ツ) ★

۱) الف) $\left(\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}\right) = \frac{2}{4} - \frac{3}{4} = -\frac{1}{4}$ ✓

ب) $\frac{1+3\,\frac{\sin^2 330}{\cos^2 210}}{4\cos^2 420 + 2\cos^2 135} = \frac{1+3\times\frac{1}{3}}{4\times\frac{1}{4}+2\times\frac{2}{4}} = \frac{1+1}{1+1} = \frac{2}{2} = 1$ ✓

②

۲) الف)



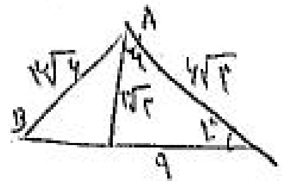
$2\sqrt{3} \Rightarrow AH = \frac{\sqrt{2}}{2}\times\sqrt{6} = \sqrt{3}$

$AH = \frac{1}{2}AC \Rightarrow C = 30°$ ✓

$\Rightarrow HC = \frac{\sqrt{3}}{2}\times 2\sqrt{3} = 3$

②

ب)



$AC = CH \Rightarrow AC = 3\sqrt{3}\times 2 = 6\sqrt{3}$

$\frac{1}{2}\times 6\sqrt{3} = AH = 3\sqrt{3}$

$\sin B = \frac{3\sqrt{3}}{3\sqrt{6}} = \frac{\sqrt{2}}{2} \Rightarrow \begin{cases} B = 135 \\ B = 45 ✓ \end{cases}$ [illegible] $B = 45°$

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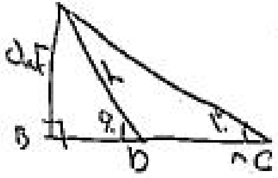
۳) الف)

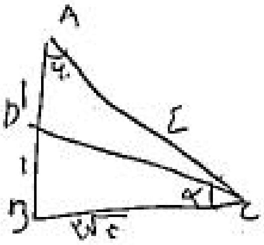


$\sin 60 = \frac{50\sqrt{3}}{AD} = \frac{\sqrt{3}}{2} \to AD = 100$

$\hat{B} = 90° \Rightarrow B\hat{A}D = 30°$ $\quad ABC \left.\begin{matrix} B = 90 \\ C = 30 \end{matrix}\right\} A = 60 \to DAC = 30$

$D\hat{A}C = DCA \Rightarrow AD = DC \to \boxed{x = 100}$

ب)

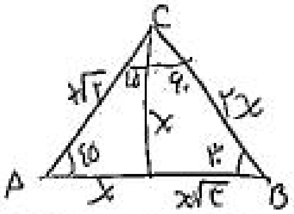


$\cos 60 = \frac{1}{2} \to \frac{2}{AC} = \frac{1}{2} \Rightarrow AC = 4 \quad BC = \frac{\sqrt{3}}{2}\times 4 = 2\sqrt{3}$ ②

$\Rightarrow \cot\alpha = 2\sqrt{3} \to 1+\cot^2\alpha = \frac{1}{\sin^2\alpha} \to 13 = \frac{1}{\sin^2\alpha} \Rightarrow \sin^2\alpha = \frac{1}{13} \Rightarrow \sin\alpha = \frac{1}{\sqrt{13}} = \frac{\sqrt{13}}{13}$ ✓

$S_{A\hat{B}C} = \frac{1}{2}\times AC\times BC\times \sin C = \frac{1}{2}\times BC\times AB\times \sin 30 = \frac{1}{2}\times AC\times AB\times \sin 45$

۴)



$AB = x(1+\sqrt{3})$

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

②

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۵) $\frac{S_{ABE}}{S_{BDC}} = \frac{\cancel{\frac{1}{2}}\times 4\times 4\times \cancel{\sin B_1}}{\cancel{\frac{1}{2}}\times 4\times 9\times \cancel{\sin B_2}} = \frac{4}{9}$ ✓ $\quad \hat{B}_1 = \hat{B}_2$ [illegible] $\Rightarrow \sin B_1 = \sin B_2$

②

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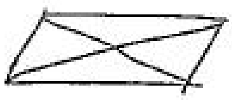
۶) الف) $S_{\text{متوازی‌الاضلاع}} = 2\times\frac{1}{2}\times 3\times 4\times\sin 120 = 3\times 4\times\frac{\sqrt{3}}{2} = 6\sqrt{3}$ ✓

ب)



$2\times\frac{1}{2}\times 2\times\frac{3}{2}\times\sin 120 + 2\times\frac{1}{2}\times 2\times\frac{3}{2}\times\sin 60 \xrightarrow{\sin 60 = \sin 120}$

$4\times\frac{1}{2}\times 2\times\frac{3}{2}\sin 60 = 6\times\sin 60 = 6\times\frac{\sqrt{3}}{2} = 3\sqrt{3}$ ✓

②

۷)

۱,۷۵

$y = ax + b$

$a = \frac{\Delta y}{\Delta x} = \tan\theta$ $\tan = \frac{۲}{۴} = \frac{۱}{۲}$

زاویه حاده ← $\cos\theta = \frac{۲}{\sqrt{۵}}$

θ زاویه با جهت مثبت $\Rightarrow \alpha = \theta \rightarrow \tan\theta = \frac{۱}{۲} \rightarrow ۱ + \tan^۲\theta = \frac{۱}{\cos^۲\theta} \rightarrow \cos^۲\theta = \frac{۴}{۵} \rightarrow \cos\theta = \frac{\pm ۲}{\sqrt{۵}}$

زاویه با جهت منفی $\Rightarrow \alpha + ۱۸۰ - \theta \Rightarrow \tan\theta = -\tan\alpha \Rightarrow ۱ + \tan^۲\theta = \frac{۱}{\cos^۲\theta} \rightarrow \cos^۲\theta = \frac{۴}{۵} \rightarrow \cos\theta = \frac{\pm ۲}{\sqrt{۵}}$

$\Longrightarrow \cos\theta = \frac{\pm ۲}{\sqrt{۵}}$

زاویه حاده است! $\cos\theta = \frac{-۲}{\sqrt{۵}}$ چون زاویه باز می‌گوید

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۸)

عرض نقطه‌ی تقاطع $= b =$ عرض از مبدا $\Rightarrow ۲y = ۲x + ۵ \underset{x=0}{\Rightarrow} y = \frac{۵}{۲} \Rightarrow (0, \frac{۵}{۲}) \Rightarrow b = \frac{۵}{۲}$

$۲y = ۲x + ۵ \longrightarrow y = x + \frac{۵}{۲} \Rightarrow ۱ = \tan\alpha \Rightarrow \alpha = ۴۵ \angle ⑦⑤$

$A_۱ = ۱۸۰ - (۷۵ + ۴۵) = ۶۰ \Rightarrow A_۲ = ۱۸۰ - ۶۰ = ۱۲۰$

$m = \tan A_۲ = \tan ۱۲۰ = -\sqrt{۳}$

$m = -\sqrt{۳}$ $b = \frac{۵}{۲} \Rightarrow mb = \boxed{\frac{-۵\sqrt{۳}}{۲}}$ ✓

۲

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۹)

۱,۷۵

$f(\frac{۵\pi}{۶}) = \cos(\pi + \frac{۵\pi}{۶}) + \sin(\frac{\pi}{۲} - \frac{۵\pi}{۶}) - \tan(\frac{۳\pi}{۲} + \frac{۵\pi}{۶}) =$

$\cos(\frac{۵\pi}{۶}) - \cos(\frac{۵\pi}{۶}) - \cot(\frac{۵\pi}{۶}) = + \cot(\frac{۵\pi}{۶}) = \frac{+\cos ۱۵۰}{\sin ۱۵۰} = \frac{\frac{\sqrt{۳}}{۲}}{\frac{۱}{۲}} = \sqrt{۳}$

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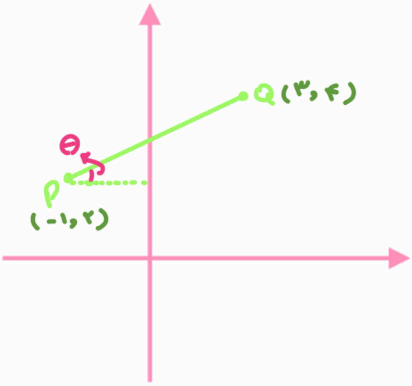
۱۰)

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

$\frac{\sin(\frac{\pi}{۲} + x) + \cos(\frac{۳\pi}{۲} - x)}{\cos(\pi + x) - \sin(۳\pi - x)}$ ✓

۲

۷



$$m_{PQ} = \frac{۴-۲}{۳-(-۱)} = \frac{۱}{۲} = \tan\theta \rightarrow 1+\tan^{۲}\theta = \frac{1}{\cos^{۲}\theta}$$

$$1+\frac{1}{4} = \frac{1}{\cos^{۲}\theta} \rightarrow \cos^{۲}\theta = \frac{۴}{۵} \xrightarrow[\cos\theta>0]{\text{حاده}\ \theta} \cos\theta = \frac{۲}{\sqrt{۵}} \text{ یا } \frac{۲\sqrt{۵}}{۵}$$

۹

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

$$+\ \cot x$$

$$f(x) = \cot x \longrightarrow f(\frac{۵\pi}{۴}) = \cot(\frac{۵\pi}{۴}) = -\sqrt{۳}$$