شیبابتیاش — دهم دختر B — شماره تکلیف: ۲۰

۱) الف)

$$\left(\sin 135^\circ + \sin 300^\circ\right)\left(\cos 315^\circ - \cos 150^\circ\right)$$

$$\left(+\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2}\right)$$

مزدوج $\Rightarrow \left(\frac{\sqrt{2}}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{1}{2} - \frac{3}{4} = \boxed{-\frac{1}{4}}$ ← جواب

ب)

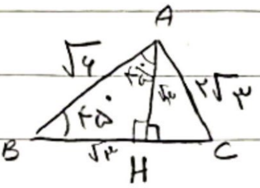
$$\tan 210^\circ = \frac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{1}{2} \times \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} \to \tan^2 210 \to \frac{1}{3} \xrightarrow{\times 3} 1+1 = \boxed{2}$$

$$\cos 330 = \frac{\sqrt{3}}{2} \xrightarrow{\text{به توان ۲}} \frac{3}{4} \xrightarrow{\times 4} \boxed{3}$$

$$\cos 225 = \frac{\sqrt{2}}{2} \xrightarrow{\text{به توان ۲}} \frac{2}{4} \xrightarrow{\times 2} \boxed{1}$$

$$\frac{2}{3+1} = \frac{2}{4} = \boxed{\frac{1}{2}}$$ ← جواب

۲) الف)

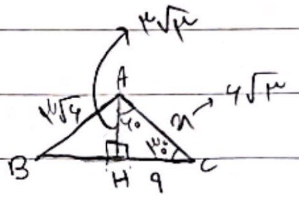


$$AH = \frac{\sqrt{2}}{2} \times \sqrt{6} = \frac{\sqrt{12}}{2} = \frac{2\sqrt{3}}{2} = \boxed{\sqrt{3}}$$

$$(\sqrt{3})^2 + x^2 = (2\sqrt{3})^2$$

$$3 + x^2 = 12 \to x^2 = 9 \to x = \pm 3 \to \boxed{3}$$ (غ ق ق) ← جواب

ب)



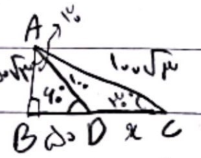
$$\frac{\sqrt{3}}{2} \times x = 9 \to x = 9 \times \frac{2}{\sqrt{3}} = \frac{18}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{18\sqrt{3}}{3}$$

$$\boxed{x = 6\sqrt{3}}$$

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

$$\sin \hat{B} = \frac{3\sqrt{3}}{3\sqrt{6}} = \frac{\sqrt{3}}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{18}}{6} = \frac{3\sqrt{2}}{6} = \frac{\sqrt{2}}{2} \to 45^\circ \checkmark, \quad 135^\circ \times$$

۳) الف)



$$\sin 60^\circ = \frac{\sqrt{3}}{2} \times a = 50\sqrt{3}$$

$$a = 50\sqrt{3} \times \frac{2}{\sqrt{3}} = 100$$

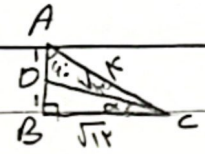
$$\frac{50\sqrt{3}}{AC} = \frac{1}{2}$$

$$AC = 100\sqrt{3}$$

$$150 - 50 = \boxed{100}$$ → جواب

$$(50\sqrt{3})^2 + x^2 = (100\sqrt{3})^2 \to x = \sqrt{30000 - 7500} = \sqrt{22500} = \boxed{150}$$

ب)



$\cos 60^\circ = \frac{1}{2} = \frac{2}{x} \rightarrow x = 4$

$2^2 + m^2 = 4^2 \rightarrow m = \sqrt{16-4} = \sqrt{12}$

$1^2 + (\sqrt{12})^2 = x^2$

$x = \sqrt{1+12} = \sqrt{13}$

$\sin\alpha = \frac{1}{\sqrt{13}} \times \frac{\sqrt{13}}{\sqrt{13}} = \frac{\sqrt{13}}{13}$ ← جواب

(۴)

$\frac{AB}{AC} = ?$

$x = \frac{1}{2} \times O \rightarrow O = 2x$

$\frac{\sqrt{2}}{2} \times O = x \rightarrow O = x \times \frac{2}{\sqrt{2}} = \frac{2x}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}x}{2} = \sqrt{2}x$

$y^2 + x^2 = (\sqrt{3}x)^2$

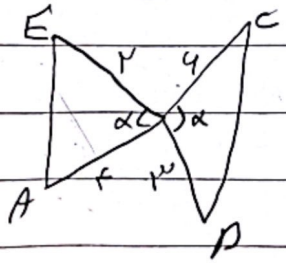
$y = \sqrt{3x^2 - x^2} = \sqrt{2x^2} = x$

$x^2 + O^2 = (2x)^2$

$O = \sqrt{4x^2 - x^2} = \sqrt{3x^2} = x\sqrt{3}$

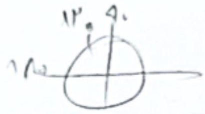
$\frac{AB}{AC} = \frac{x(1+\sqrt{3})}{\sqrt{2}x} = \frac{(1+\sqrt{3})}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}+\sqrt{6}}{2}$

(۵)



$\frac{ABE}{BCD} = \frac{\frac{1}{2} \times 2 \times 4 \times \sin\alpha}{\frac{1}{2} \times 3 \times 4 \times \sin\alpha} = \frac{4}{6}$

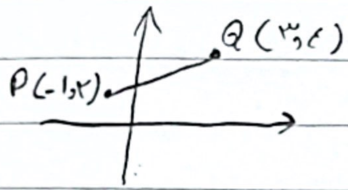
ب جواب



(۶) الف) $\frac{1}{۲}\times ۳\times ۴\times \sin ۱۲۰^\circ \to ۳\times ۲\times \frac{\sqrt{۳}}{۲} = ۳\sqrt{۳}\times ۲ = ۶\sqrt{۳}$

ب) $\frac{1}{۲}\times ۳\times ۴\times \sin ۱۲۰^\circ = ۳\sqrt{۳}$

(۷)



$\to \frac{۴-۲}{۳-(-۱)} = \frac{۲}{۴} = \frac{۱}{۲} = \tan\theta$

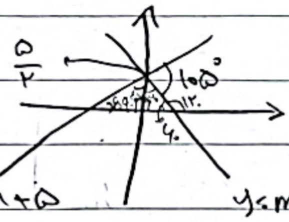
$۱+\tan^۲\theta = \frac{۱}{\cos^۲\theta}$

$۱+\frac{۱}{۴} = \frac{۱}{\cos^۲}$

$\frac{۵}{۴} = \frac{۱}{\cos^۲} \to \cos^۲ = \frac{۴}{۵}$

$\cos\theta = \frac{۲}{\sqrt{۵}}$

(۸)



$mb = ?$

$۲y = ۲x + ۵$ $\qquad y = mx + b$

$y = x + \frac{۵}{۲}$ $\qquad b = \frac{۵}{۲}$

$\tan\theta = ۱ \to \theta = ۴۵^\circ$

$\tan ۱۲۰^\circ = \frac{\sqrt{۳}}{۲}\times\frac{-۲}{۱} = -\sqrt{۳}$

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

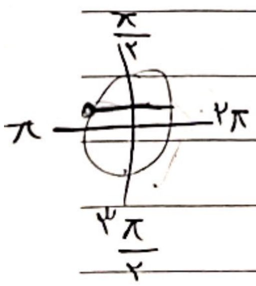
جواب

(۹)

$f(\frac{۵\pi}{۶}) = \cos(\pi + \frac{۵\pi}{۶}) + \sin(\frac{\pi}{۲} - ۱۵۰^\circ) - \tan(\frac{۳\pi}{۲} + ۱۵۰^\circ)$

$\cos(۱۵۰^\circ) \quad -\cos(۱۵۰^\circ) \quad \cot(۱۵۰^\circ)$

$-\frac{\sqrt{۳}}{۲} + \frac{\sqrt{۳}}{۲} - (-\sqrt{۳}) = \sqrt{۳}$ → جواب



$\frac{-\sqrt{۳}}{۲}\times\frac{۲}{۱} = -\sqrt{۳}$

MRNOTE

$\frac{17\pi}{2}+\frac{\pi}{2}$ $\quad$ $17\pi+\frac{\pi}{2}$

$$\frac{\sin\left(\frac{17\pi}{2}+\alpha\right)+\cos\left(\frac{19\pi}{2}-\alpha\right)}{\cos(17\pi+\alpha)-\sin(4\pi-\alpha)}$$

(10)

$$\frac{\cos(\alpha)+\sin(\alpha)}{-\cos(\alpha)+\sin(\alpha)} = \frac{\cos(\alpha)+\sin(\alpha)}{-(\cos(\alpha)-\sin(\alpha))} = -1$$