★(ش) آفرین ۱۹٫۷۵

مثلثات دهم دختر B شماره تکلیف: ۲۰

الف) $(\sin 135^\circ + \sin 300^\circ)(\cos 315^\circ - \cos 150^\circ)$ مزدوج

$\left(\frac{\sqrt{2}}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{1}{2} - \frac{3}{4} = \frac{-1}{4}$ (1)

$+\frac{\sqrt{2}}{2} \quad -\frac{\sqrt{3}}{2} \quad \frac{\sqrt{2}}{2} \quad -\frac{\sqrt{3}}{2}$

← جواب

ب) (2)

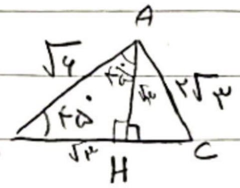
$\tan 210^\circ = \frac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{1}{2} \times \frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} \to \tan^2 210 \to \frac{1}{3} \xrightarrow{\times 3} 1+1 = 2$

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

$\frac{2}{3+1} = \frac{2}{4} = \frac{1}{2}$

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

← جواب



الف) (2)

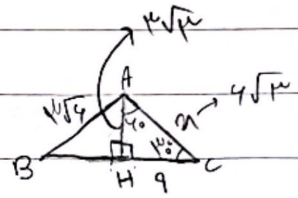
$AH = \frac{\sqrt{2}}{2} \times \sqrt{6} = \frac{\sqrt{12}}{2} = \frac{2\sqrt{3}}{2} = \sqrt{3}$

(2)

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

$3 + x^2 = 12 \to x^2 = 9 \to x = \pm 3 \to 3$

غ ق ق ← جواب



ب)

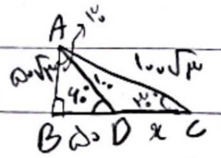
$\frac{\sqrt{3}}{2} \times x = 9 \to x = 9 \times \frac{2}{\sqrt{3}} = \frac{18}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{18\sqrt{3}}{3}$

$x = 6\sqrt{3}$

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

$\sin \hat{B} = \frac{3\sqrt{3}}{3\sqrt{6}} = \frac{\sqrt{3}}{\sqrt{6}} \times \frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{18}}{6} = \frac{3\sqrt{2}}{6} = \frac{\sqrt{2}}{2} \to 45^\circ$ ✓

$\searrow 135^\circ$ ✗



الف) (3) (2)

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

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

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

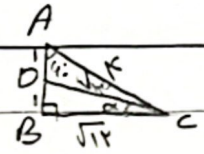
$150 - 50 = 100$ ← جواب

$AC = 100\sqrt{3}$

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

MRNOTE

ب)



$\cos ۶۰^\circ = \frac{۱}{۲} = \frac{۲}{x} \rightarrow x = ۴$

$۲^۲ + x^۲ = ۴^۲ \rightarrow x = \sqrt{۱۶ - ۴} = \sqrt{۱۲}$

$۱^۲ + (\sqrt{۱۲})^۲ = x^۲$

$x = \sqrt{۱ + ۱۲} = \sqrt{۱۳}$

$\sin\alpha = \frac{۱}{\sqrt{۱۳}} \times \frac{\sqrt{۱۳}}{\sqrt{۱۳}} = \frac{\sqrt{۱۳}}{۱۳}$ → جواب

۴

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

$\frac{\sqrt{۳}}{۲} \times O = x \rightarrow O = x \times \frac{۲}{\sqrt{۳}} = \frac{۲x}{\sqrt{۳}} \times \frac{\sqrt{۳}}{\sqrt{۳}} = \frac{۲\sqrt{۳}x}{۳} = \sqrt{۳}x$

$x = \frac{۱}{۲} \times O \rightarrow O = ۲x$

$y^۲ + x^۲ = (\sqrt{۳}x)^۲$

$y = \sqrt{۳x^۲ - x^۲} = \sqrt{x^۲} = x$

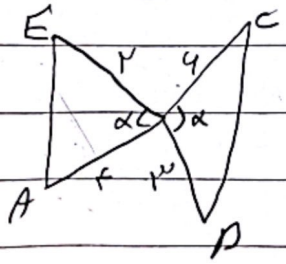
$x^۲ + O^۲ = (۲x)^۲$

$O = \sqrt{۴x^۲ - x^۲} = \sqrt{۳x^۲} = x\sqrt{۳}$

۵

$\frac{AB}{AC} = \frac{x(۱ + \sqrt{۳})}{\sqrt{۳}x} = \frac{(۱ + \sqrt{۳})}{\sqrt{۳}} \times \frac{\sqrt{۳}}{\sqrt{۳}} = \frac{\sqrt{۳} + \sqrt{۹}}{۳}$

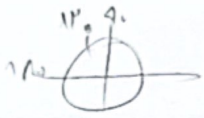
۶



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

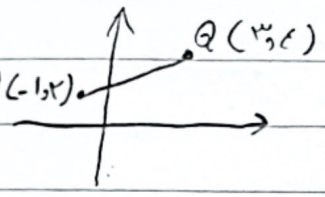
ب جواب

۷



الف) $\frac{1}{2} \times 3 \times 4 \times \sin 120^\circ \rightarrow \frac{3 \times 4 \times \sqrt{3}}{2} = 6\sqrt{3}$ (۴)

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



$\rightarrow \frac{4-2}{3-(-1)} = \frac{2}{4} = \frac{1}{2} = \tan\theta$ (۷)

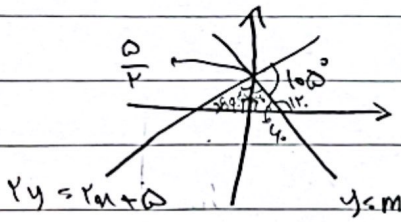
$1 + \tan^2\theta = \frac{1}{\cos^2\theta}$

$1 + \frac{1}{4} = \frac{1}{\cos^2}$

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

$\cos = \pm \frac{2}{\sqrt{5}}$

x



$mb = ?$ (۸)

$2y = 2x + 5$

$y = mx + b$

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

$y_b = \frac{5}{2}$

$\tan\theta = 1 \rightarrow \theta = 45^\circ$

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

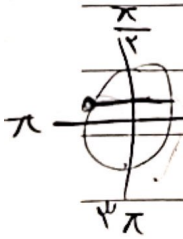
$-\sqrt{3} \times \frac{5}{2} = -\frac{5\sqrt{3}}{2}$

جواب ۱

$f(\frac{5\pi}{4}) = \cos(\pi + \frac{5\pi}{4}) + \sin(\frac{\pi}{2} - 135^\circ) - \tan(\frac{3\pi}{2} + 135^\circ)$ (۹)

$\cos(135^\circ) - \cos(45^\circ) \pm \cot(135^\circ)$

$-\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} + (-\sqrt{3}) = -\sqrt{3}$ → جواب ۱



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

$\underbrace{\cos(\pi + x)}_{-\cos x} + \underbrace{\sin(\frac{\pi}{2} - x)}_{\cos x} - \underbrace{\tan(\frac{3\pi}{2} + x)}_{\cot x}$

$f(x) = \cot x \rightarrow f(\frac{3\pi}{4}) = \cot(\frac{3\pi}{4}) = -\sqrt{3}$

MRNOTE

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

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

10

2

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