نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ۱۳ ... کلاس ۱۰A (ریاضی)

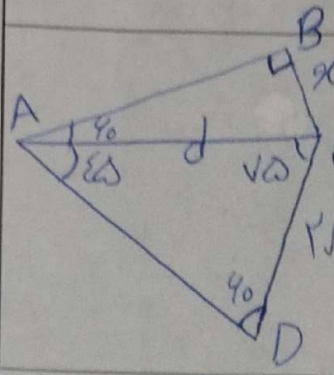
$\hat{A}+\hat{B}+\hat{C}=180^\circ \rightarrow \hat{A}=60^\circ \rightarrow a=BC=20 \quad \hat{B}=? \quad \hat{C}=?$

$\hat{B}+\hat{C}=120^\circ$

$b=AC=\frac{20\sqrt{6}}{3}$

قانون سینوس‌ها: $\frac{a}{\sin A}=\frac{b}{\sin B} \rightarrow \frac{20}{\frac{\sqrt{3}}{2}}=\frac{\frac{20\sqrt{6}}{3}}{\sin B} \rightarrow \sin B=\frac{\sqrt{2}}{2} \rightarrow \hat{B}=45^\circ$ ✓ (۲)

$B+C=120 \rightarrow \hat{C}=75^\circ$ ✓



$\frac{d}{\sin D}=\frac{a}{\sin A} \rightarrow \frac{d}{\sin 60}=\frac{2\sqrt{2}}{\sin 45} \rightarrow d=2\sqrt{3}$ (۲)

$\sin 60^\circ=\frac{x}{d} \rightarrow \frac{x}{2\sqrt{3}}=\frac{\sqrt{3}}{2} \rightarrow x=3$ ✓ (۲)

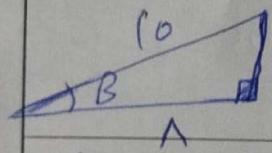
$\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$

$(b^2-2)\sin C=c\sin B \rightarrow \frac{b^2-2}{\sin B}=\frac{c}{\sin C} \rightarrow \frac{b^2-2}{\sin B}=\frac{b}{\sin B}$ (۲)

$\rightarrow b^2-b-2=0 \begin{cases} b=-1 \ \text{✗} \\ b=2 \ \text{✓} \end{cases} \rightarrow b=2$ ✓

$b^2=a^2+c^2-2ac\cos B \rightarrow 14^2=21^2+10^2-2(21)(10)\cos B$

$149=441-420\cos B \rightarrow 292=420\cos B \rightarrow \cos B=\frac{292}{420}=\frac{73}{105}$ ✓



$\rightarrow \sin B=\frac{9}{10}$ ✓ (۲)

الف) $a^2=b^2+c^2-2bc\cos A \rightarrow a^2=14+4(1+\sqrt{3})^2-2(4)(4+2\sqrt{3})\frac{1}{2}$

$a^2=24 \rightarrow a=2\sqrt{6}$ ✓ (۲)

ب) $\frac{a}{\sin A}=\frac{b}{\sin B} \rightarrow \frac{2\sqrt{6}}{\sin 60}=\frac{4}{\sin B} \rightarrow \hat{B}=45^\circ$ ✓ (۵)

$60+45+\hat{C}=180$

$\hat{C}=75^\circ$ ✓

ABC مثلث $\rightarrow a^2 = b^2 + c^2 - 2bc\cos\alpha \rightarrow 6 = 1 + 6 - 6\cos\alpha$

$\cos\alpha = \frac{1}{6}$ ✓ (۲)

ADE مثلث $\rightarrow a^2 = b^2 + c^2 - 2bc\cos\alpha \rightarrow a^2 = 14 + 22 - 12 \rightarrow a^2 = 40$ ۶

$a = DE = \sqrt{40}$ ✓

ب) $a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 25 + 46 - 80\left(\frac{1}{2}\right)$

$a^2 = 49 \rightarrow a = BC = 7$ ✓

ج) $S = \frac{1}{2}ab\sin\theta$

$S = \frac{1}{2} \times 5 \times 8 \times \sin 60^\circ$ ۷

$S = 10\sqrt{3}$ ✓ (۲)

$a^2 = b^2 + c^2 - 2bc\cos A \rightarrow b^2 + c^2 - a^2 = 2bc\cos A$

$$\frac{b^2 + c^2 + 2bc - a^2}{bc(\cos A + 1)} = \frac{2bc\cos A + 2bc}{bc(\cos A + 1)} = \frac{2bc(\cos A + 1)}{bc(\cos A + 1)} = 2$$ ✓

(۲)

$$\frac{(a^2 + b^2 + c^2 - ab - ac - bc)(a + b - c)}{(a + b - c)} = a^2 \rightarrow b^2 + c^2 = ab + ac + bc$$

$a^2 = b^2 + c^2 - 2bc\cos A \rightarrow b^2 + c^2 = a^2 + 2bc\cos A$ (۱)

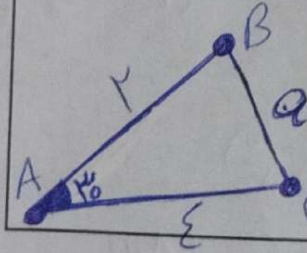
$a^2 + 2bc\cos A = ab + ac + bc \rightarrow \cos A = \frac{ab + ac + bc - a^2}{2bc}$

$a^2 = b^2 + c^2 + bc \rightarrow 2\cos\hat{A} = -1 \rightarrow \cos\hat{A} = -\frac{1}{2} \rightarrow \hat{A} = 120^\circ$

$$S = \frac{(3 - \cos\theta)(1 + 3\cos\theta)}{4} = 2 \rightarrow 3\cos^2\theta - 8\cos\theta + 5 = 0$$

$a + b + c = 0 \rightarrow \cos\theta = 1$ ✓

$\cos\theta = \frac{5}{3}$ ✗



$a^2 = b^2 + c^2 - 2bc\cos A$ (۲)

$a^2 = 16 + 4 - 16\left(\frac{\sqrt{3}}{2}\right) \rightarrow a^2 = 20 - 8\sqrt{3}$ ✓