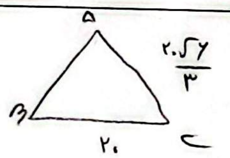
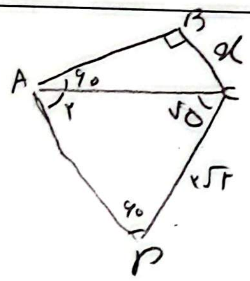
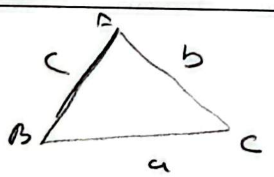
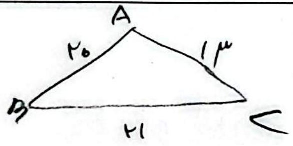
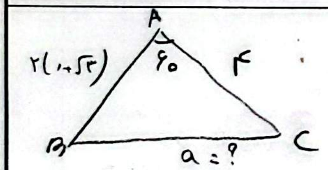
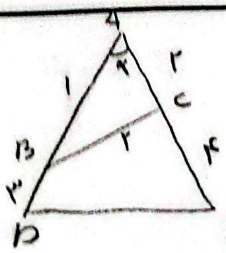
نام و نام خانوادگی ..... سالار هیتیان ..... پاسخنامه تشریحی تکلیف شماره .... کلاس .... دوازدهم B

۱	$BC = 20$ $\quad AC = \frac{20\sqrt{6}}{3}$ $\hat{B} + \hat{C} = 120$  $B+C+A = 180 \xrightarrow{B+C=120} 120 + A = 180 \rightarrow A = 60$ سینوس ها $\rightarrow \frac{BC}{\sin A} = \frac{AC}{\sin B} \rightarrow \frac{20}{\frac{\sqrt{3}}{2}} = \frac{\frac{20\sqrt{6}}{3}}{\sin B} \rightarrow \sin B = \frac{\sqrt{2}}{2} \rightarrow \boxed{B = 45}$, $B = 135$ $B + C = 120 \rightarrow 45 + C = 120 \rightarrow \boxed{C = 75}$
۲	 $A_2 + 75 + 60 = 180 \rightarrow A_2 = 45$ سینوس ها $\rightarrow \frac{DC}{\sin A_2} = \frac{AC}{\sin D} \rightarrow \frac{2\sqrt{2}}{\frac{\sqrt{2}}{2}} = \frac{AC}{\frac{\sqrt{3}}{2}} \rightarrow AC = 2\sqrt{3}$ $\rightarrow \sin 60 = \frac{BC}{AC} = \frac{\alpha}{2\sqrt{3}} = \frac{\sqrt{3}}{2} \rightarrow \boxed{\alpha = 3}$
۳	 $(b^2-2)\frac{\sin C}{\sin B} = c$ $\quad$ سینوس ها $\frac{b}{\sin B} = \frac{c}{\sin C}$ $\times \frac{1}{\sin C} \Rightarrow \frac{b^2-2}{\sin B} = \frac{c}{\sin C} = \frac{b}{\sin B} \rightarrow b^2 - 2 = b$ $b^2 - b - 2 = 0 \rightarrow (b-2)(b+1) = 0 \rightarrow \boxed{b = 2}$
۴	 قضیه کسینوس ها $\rightarrow AC^2 = AB^2 + BC^2 - 2AB \cdot BC\cos B$ $\rightarrow 169 = 400 + 441 - 840\cos B$ $\rightarrow \cos B = 0.8 \rightarrow \sin^2 B + \cos^2 B = 1 \rightarrow \boxed{\sin B = 0.6}$
۵	 $\rightarrow a^2 = b^2 + c^2 - 2bc\cos A \rightarrow a^2 = 16 + 16 + \cancel{8\sqrt{3}} - 8 - \cancel{8\sqrt{3}}$ $a^2 = 24 \rightarrow a = \sqrt{24} = 2\sqrt{6}$ قضیه سینوس ها $= \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \rightarrow \frac{2\sqrt{6}}{\frac{\sqrt{3}}{2}} = \frac{4}{\sin B} =$ $\sin B = \frac{\sqrt{2}}{2} \rightarrow \boxed{B = 45} \xrightarrow[A+B+C=180]{} \boxed{C = 75}$ ب

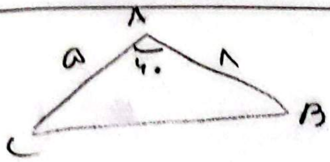


$ABC \rightarrow BC^2 = AC^2 + AB^2 - 2 \times AC \times AB \cos\alpha$

$\rightarrow 4 = 4 + 1 - 2 \times 2 \cos\alpha \rightarrow \cos\alpha = \frac{1}{4}$

$ADE \rightarrow DE^2 = AD^2 + AE^2 - 2AD \times AE \cos\alpha$

$\rightarrow DE^2 = 36 + 16 - 2 \times 6 \times 4 \times \frac{1}{4} \rightarrow DE = \sqrt{40} = \boxed{2\sqrt{10}}$



الف) $BC^2 = AB^2 + AC^2 - 2AB \times AC \cos\alpha$

$\rightarrow BC^2 = 64 + 25 - 2 \times 8 \times 5 \times \frac{1}{2} \rightarrow \boxed{BC = 7}$

ب) $S = \frac{1}{2} AC \times AB \times \sin A = \frac{1}{2} \times 5 \times 8 \times \frac{\sqrt{3}}{2} = 10\sqrt{3}$

$\frac{(b+c)^2 - a^2}{bc(\cos\hat{A} + 1)} \xrightarrow{\text{قضیه کسینوس‌ها}} a^2 = b^2 + c^2 - 2bc\cos A$

$\rightarrow \frac{\cancel{b^2} + \cancel{c^2} + 2bc - \cancel{b^2} - \cancel{c^2} + 2bc\cos A}{bc(1+\cos\hat{A})} = \frac{2bc(1+\cos A)}{bc(1+\cos A)} = \boxed{2}$

$\frac{a^3 + b^3 - c^3}{a + b - c} = a^2 \rightarrow \cancel{a^3} + b^3 - c^3 = \cancel{a^3} + a^2(b-c)$

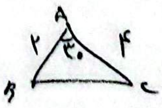
$\rightarrow (b-c)(b^2 + c^2 + bc) = a^2(b-c) \xrightarrow{a \neq c} a^2 = b^2 + c^2 + bc$

$\xrightarrow{\text{قضیه کسینوس‌ها}} a^2 = b^2 + c^2 - 2bc \times \cos A \rightarrow \boxed{\cos A = -\frac{1}{2}} \rightarrow \boxed{A = 120}$

$S = \frac{1}{2} AB \times AC \times \sin 30 \rightarrow \frac{1}{4} \times (3 - \cos\theta)(1 + 3\cos\theta) = 2$

$\rightarrow 3 + 8\cos\theta - 3\cos^2\theta - \cancel{8} = 0 \rightarrow -3\cos^2\theta + 8\cos\theta + 5 = 0$

$\cos\theta = 1 \quad \cos\theta \overset{\times}{=} \frac{5}{3} \longrightarrow \cos\theta = 1$



$\rightarrow a^2 = AB^2 + AC^2 - 2AB \times AC \times \cos 30 \rightarrow a^2 = 16 + 4 - 2 \times 4 \times 2 \times \frac{\sqrt{3}}{2} = \boxed{20 - 8\sqrt{3}}$

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