

۳۰ سین

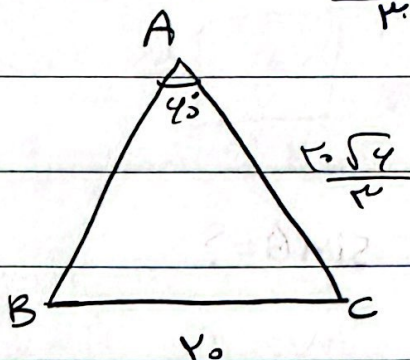
دوازدهم A

مریم نیکوئی

$$BC = 20 \quad \hat{B} + \hat{C} = 110^\circ \quad AC = \frac{20\sqrt{4}}{3}$$

(سوال ۱)

$$\hat{B} = ? \quad \hat{C} = ?$$

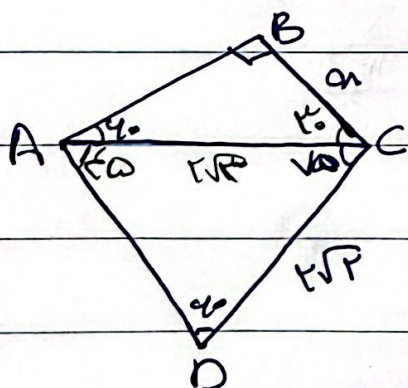


$$\frac{BC}{\sin A} = \frac{AC}{\sin B}$$

$$\rightarrow \frac{20}{\frac{20\sqrt{4}}{3}} = \frac{20\sqrt{4}}{3} \rightarrow \frac{\sqrt{4}}{4} = \sin \hat{B} \Rightarrow \sin \hat{B} = \frac{\sqrt{4}}{4} \Rightarrow \hat{B} = 45^\circ$$

$$\hat{C} = 110^\circ - 45^\circ = 65^\circ$$

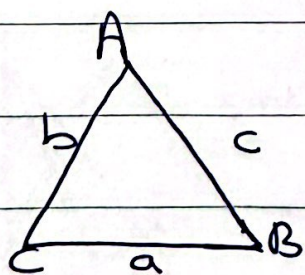
(سوال ۲)



$$\frac{2\sqrt{2}}{\sin 40^\circ} = \frac{AC}{\sin 50^\circ} \rightarrow \frac{2\sqrt{2}}{\frac{\sqrt{2}}{2}} = \frac{AC}{\frac{\sqrt{2}}{2}}$$

$$\Rightarrow AC = 2\sqrt{2}$$

$$n = BC \rightarrow BC = \frac{r}{AC} \times \sin 40^\circ \rightarrow BC = \frac{2\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = 1$$



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

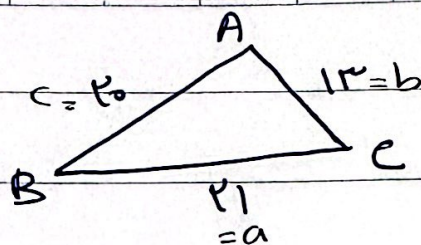
$$\frac{c}{\sin \hat{C}} = \frac{b}{\sin \hat{B}} \Rightarrow c = b \frac{\sin \hat{C}}{\sin \hat{B}} \quad (1)$$

$$c = (b^2 - r) \frac{\sin \hat{C}}{\sin \hat{B}} \quad (2)$$

$$(1) \times (2) \Rightarrow b^2 - r = b \Rightarrow b^2 - b - r = 0$$

$$\rightarrow (b-r)(b+1) = 0 \rightarrow b = r$$

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$$\sin \hat{B} = \frac{c}{a}$$

(سوال ٤)

$$b^2 = a^2 + c^2 - 2ac \cos \hat{B}$$

$$\Rightarrow 149 = \frac{r_0^2 + r_1^2}{\Lambda^2} - \frac{(r_0 \times r_1 \times \cos \hat{B})}{\Lambda^2}$$

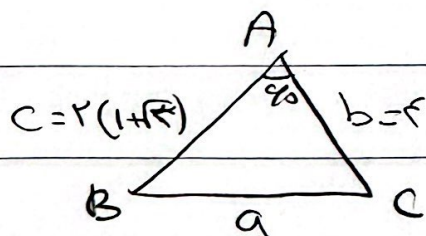
$$\Rightarrow \Lambda^2 \cos \hat{B} = 4r_1$$

$$\cos \hat{B} = \frac{4r_1}{\Lambda^2} = \frac{\epsilon}{\Delta}$$

$$\cos^2 \hat{B} + \sin^2 \hat{B} = 1 \rightarrow \frac{14}{r_1^2} + \sin^2 \hat{B} = 1 \rightarrow \sin^2 \hat{B} = \frac{9}{r_1^2} \rightarrow \boxed{\sin \hat{B} = \frac{3}{\Delta}}$$

$$b = r \quad c = r(1 + \sqrt{r}) \quad \hat{A} = 40^\circ$$

(سوال ٥)



(الت) a = r

$$a^2 = b^2 + c^2 - 2bc \cos \hat{A}$$

$$\Rightarrow a^2 = 14 + 14 + \Lambda^2 r - (r \times \epsilon \times (1 + \sqrt{r}) \times \frac{1}{r})$$

$$\Rightarrow a^2 = 14 + 14 + \Lambda^2 r - 1 - \Lambda^2 r = 2\epsilon \Rightarrow a = \sqrt{2\epsilon}$$

$$= \boxed{\sqrt{2\epsilon}}$$

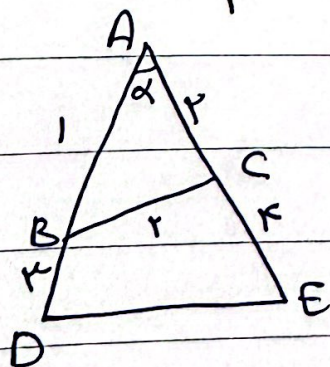
$$\frac{a}{\sin \hat{A}} = \frac{b}{\sin \hat{B}} \Rightarrow \frac{\sqrt{2\epsilon}}{\frac{1}{r}} = \frac{r}{\sin \hat{B}} \Rightarrow \sqrt{2\epsilon} \sin \hat{B} = \sqrt{r}$$

$$\hat{C} = 50^\circ \quad \hat{B} = 50^\circ$$

$$\Rightarrow \sin \hat{B} = \frac{\sqrt{r}}{r} \Rightarrow \boxed{\hat{B} = 45^\circ}$$

$$\hat{C} = 180^\circ - (40^\circ + 45^\circ) = \boxed{95^\circ}$$

(سوال ٦)



$$DE = r$$

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

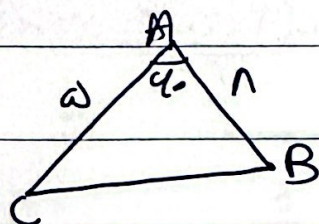
$$\Rightarrow \epsilon = 1 + \epsilon - (r \times 1 \times r \times \cos \alpha) \Rightarrow \cos \alpha = \frac{1}{r}$$

* الارتفاع من A إلى BC

$$DE^r = AD^r + AE^r - (r \times AD \times AE \times \cos \alpha)$$

$$\Rightarrow 14 + 14 - (r \times 14 \times 14 \times \frac{1}{2}) = 2r - 14 = 6 \Rightarrow DE = \sqrt{6} = \boxed{2\sqrt{6}}$$

(سوال ٧٠)



الف) طول BC

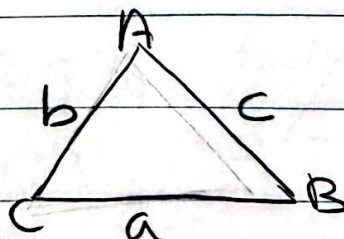
$$BC^r = AB^r + AC^r - r \times AB \times AC \times \cos 40^\circ$$

$$\Rightarrow BC^r = \frac{98 + 98 - (r \times 14 \times 14 \times \frac{1}{2})}{14} = 69 \Rightarrow BC = \sqrt{69} = \boxed{V}$$

ب) مساحت مثلث ABC

$$S = \frac{1}{r} \times AB \times AC \times \sin 40^\circ \Rightarrow S = \frac{1}{r} \times 14 \times 14 \times \frac{\sqrt{3}}{2} = \boxed{10\sqrt{3}}$$

$$\frac{(b+c)^r - a^r}{bc(\cos \hat{A} + 1)}$$



سوال ١٨

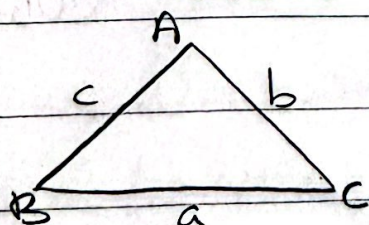
$$\Rightarrow a^r = b^r + c^r - rbc \cos \hat{A} \Rightarrow (b+c)^r - a^r = b^r + c^r + rbc \cos \hat{A} - rbc \cos \hat{A} = rbc(1 + \cos \hat{A})$$

$$\Rightarrow \frac{(b+c)^r - a^r}{bc(\cos \hat{A} + 1)} = \frac{rbc(\cos \hat{A} + 1)}{bc(\cos \hat{A} + 1)} = \boxed{r}$$

$$\frac{a^r + b^r - c^r}{a+b-c} = a^r$$

$$\cos \hat{A} = \frac{1}{r}$$

سوال ٩



$$\frac{a^r + b^r - c^r}{a+b-c} = a^r \Rightarrow a^r + b^r - c^r = a^r + a^r b - a^r c$$

$$\Rightarrow (b-c)(b^r + c^r + bc) = a^r(b-c)$$

$$\Rightarrow a^r = b^r + c^r - rbc \cos \hat{A} \Rightarrow \boxed{\cos \hat{A} = \frac{1}{r}}$$

پایان

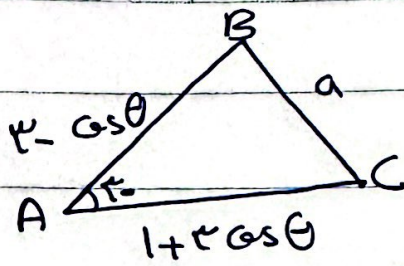
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(10 سوال)



$$a^r = s \quad s = r$$

$$S = \frac{1}{2} \times AC \times AB \times \sin \theta$$

$$\Rightarrow r = \frac{1}{2} \times (1 + r \cos \theta) \times (r \cos \theta) \times \frac{1}{r}$$

$$\Rightarrow -r \cos^2 \theta + \cos \theta + r = 1 \Rightarrow -r \cos^2 \theta + \cos \theta - 1 = 0$$

$$\begin{cases} \cos \theta = 1 \\ \cos \theta = \frac{1}{r} \times \end{cases}$$

$$\cos \theta = 1 \rightarrow 1 + r \cos \theta = 2$$

$$\rightarrow r \cos \theta = 1 \quad a^r = AB^2 + AC^2 - 2 \times AB \times AC \times \cos \theta$$

$$\rightarrow a^r = \frac{14 + 1}{r} - (1 \times 1 \times 1 \times \frac{1}{r}) = \boxed{\frac{14 - 1}{r}}$$