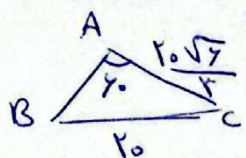


کریا ایسی بنا

تکلیف ۱۳

> راز هم دختر B

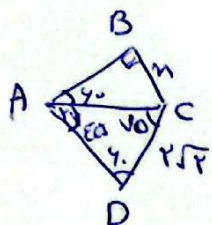


$$\hat{B} + \hat{C} = 110 \rightarrow \hat{A} = 40^\circ$$

طبق قیاس سینوس ها: $\frac{BC}{\sin A} = \frac{AC}{\sin B} \rightarrow \frac{10}{\frac{\sqrt{2}}{2}} = \frac{10\sqrt{2}}{\sin B}$

(1)

$$\rightarrow \sin B = \frac{\frac{\sqrt{2}}{2} \times 10\sqrt{2}}{10} = \frac{\sqrt{2}}{2} \rightarrow \hat{B} = 45^\circ \rightarrow \hat{C} = 110 - 45 = 65^\circ$$



$$AD = 110 - 45 - 40 = 45^\circ$$

طبق قیاس سینوس ها: $\frac{10\sqrt{2}}{\sin 45} = \frac{AC}{\sin 40} \rightarrow AC = \frac{\frac{\sqrt{2}}{2} \times 10\sqrt{2}}{\frac{\sqrt{2}}{2}} = 10\sqrt{2}$

(2)

$$\sin 40 = \frac{\sqrt{2}}{2} = \frac{n}{AC} = \frac{n}{10\sqrt{2}} \rightarrow n = \frac{10\sqrt{2} \times \sqrt{2}}{2} = 10$$

$$(b^2 - 1) \frac{\sin \hat{C}}{\sin \hat{B}} = c \rightarrow (b^2 - 1) \frac{\sin \hat{C}}{c \cdot \sin \hat{B}} = 1 \rightarrow (b^2 - 1) \frac{\sin \hat{C}}{c} = \sin \hat{B} \rightarrow$$

(3)

$$\frac{b^2 - 1}{b} \times \frac{\sin \hat{C}}{c} = \frac{\sin \hat{B}}{b} \rightarrow \frac{b^2 - 1}{b} = 1 \rightarrow b^2 - 1 = b \rightarrow b^2 - b - 1 = 0 \rightarrow b = 2$$

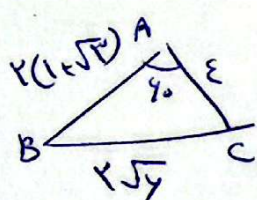
طبق قیاس سینوس ها برابرند

(4)

$\sin \hat{B}$?

$$13^2 = 10^2 + 11^2 - 2(10)(11) \cos \hat{B} \rightarrow 169 = 100 + 121 - 220 \cos \hat{B}$$

$$\rightarrow \cos \hat{B} = \frac{100 + 121 - 169}{220} = \frac{1}{10} \rightarrow \sin \hat{B} = \sqrt{1 - \cos^2 \hat{B}} = \frac{3}{10}$$



$$\rightarrow a^2 = 10^2 + (11 + 10\sqrt{2})^2 - 2(10)(11 + 10\sqrt{2}) \cos 40^\circ$$

$$\rightarrow a^2 = 100 + 121 + 220\sqrt{2} - 220 - 220\sqrt{2} \cos 40^\circ \rightarrow a^2 = 121 \rightarrow a = 11$$

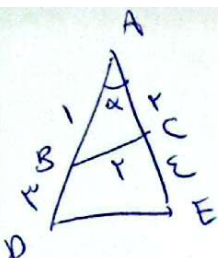
(5)

$$\frac{10\sqrt{2}}{\sin 40} = \frac{11}{\sin \hat{B}} \rightarrow \sin \hat{B} = \frac{\frac{\sqrt{2}}{2} \times 11}{10\sqrt{2}} = \frac{11}{20} \rightarrow \hat{B} = 32^\circ$$

(6)

$$\hat{C} = 110 - 40 - 32 = 38^\circ$$

(9)



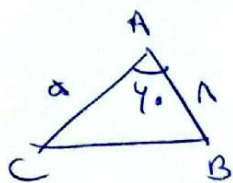
$$\triangle ABC: BC^2 = AB^2 + AC^2 - 2(AB)(AC)\cos\alpha$$

$$\rightarrow \varepsilon^2 = 1 + r^2 - \varepsilon \cos\alpha \rightarrow \varepsilon \cos\alpha = 1 \rightarrow \cos\alpha = \frac{1}{\varepsilon}$$

$$\triangle ADE: DE^2 = AD^2 + AE^2 - 2(AD)(AE)\cos\alpha$$

$$\rightarrow DE^2 = 1 + r^2 - \varepsilon \left(\frac{1}{\varepsilon}\right) \rightarrow DE^2 = \varepsilon \rightarrow DE = \sqrt{\varepsilon}$$

(10)



$$\rightarrow BC^2 = a^2 + 1^2 - 2(a)(1)\frac{1}{r} \rightarrow BC^2 = a^2 + 1 - \frac{2a}{r}$$

$$\rightarrow BC^2 = \varepsilon^2 \rightarrow BC = \sqrt{\varepsilon} \rightarrow \text{النتيجة}$$

(11)

$$S_{ABC} = \frac{1}{r} \times a \times 1 \times \sin \gamma = \frac{\sqrt{\varepsilon}}{r} = \boxed{10\sqrt{\varepsilon}}$$

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

$$= \frac{2bc(1 + \cos\hat{A})}{bc(1 + \cos\hat{A})} = \boxed{2}$$

(12)

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

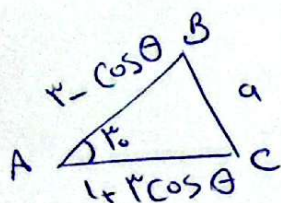
$$\rightarrow (b - c)(b^2 + c^2 + bc) = a^2(b - c) \rightarrow a^2 = b^2 + c^2 + bc$$

بقية كسري

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

$$\rightarrow bc = -2bc \cos\hat{A} \rightarrow \cos\hat{A} = \boxed{-\frac{1}{r}} \rightarrow$$

(13)



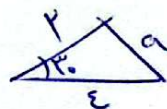
$$a^2 = ?$$

$$S_{ABC} = r = \frac{1}{r} \times (1 + r \cos\theta)(r - \cos\theta) \times \sin\gamma$$

$$\rightarrow \frac{1}{\varepsilon} (r - r \cos^2\theta + r \cos\theta - \cos\theta) = r \rightarrow -r \cos^2\theta + r \cos\theta + r = \varepsilon$$

$$\rightarrow r \cos^2\theta - r \cos\theta + \varepsilon = 0 \rightarrow \cos\theta = 1 \checkmark$$

$$\cos\theta = \frac{\varepsilon}{r}$$



$$a^2 = r^2 + \varepsilon^2 - 2(r)(\varepsilon) \frac{\sqrt{\varepsilon}}{r} \rightarrow a^2 = r^2 - \varepsilon \sqrt{\varepsilon}$$