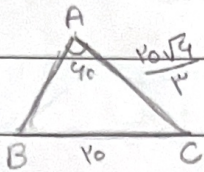


19, 7A آفرین

سارا عباسی

$BC = 10$ $\hat{B} + \hat{C} = 120^\circ$ $AC = \frac{10\sqrt{3}}{3}$ $\hat{C}, \hat{B} = ?$ (1)

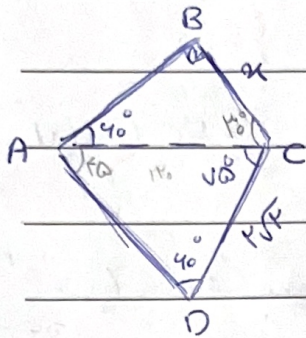


$\Downarrow$
 $A = 90^\circ$

$\frac{BC}{\sin A} = \frac{AC}{\sin B} = \frac{AB}{\sin C}$
 $\frac{10}{\frac{\sqrt{3}}{2}} = \frac{\frac{10\sqrt{3}}{3}}{\sin B}$
 $\sin B = \frac{10\sqrt{3}}{3} \times \frac{\sqrt{3}}{10} \times \frac{1}{2} = \frac{\sqrt{3}}{2}$
 $\hat{B} = 60^\circ$

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$C = 180^\circ - (90^\circ + 60^\circ) = 30^\circ$

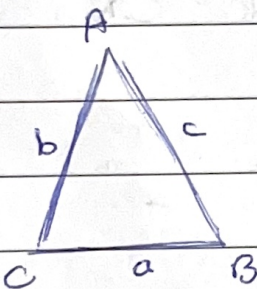


$\frac{\frac{\sqrt{3}}{2}}{\sin 60^\circ} = \frac{\frac{\sqrt{3}}{2}}{\sin 90^\circ}$

$AC = \frac{10\sqrt{3}}{\sqrt{2}} = 5\sqrt{6}$

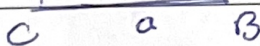
$\frac{\frac{\sqrt{3}}{2}}{\sin 90^\circ} = \frac{\sin 90^\circ}{5\sqrt{6}} \Rightarrow n = \frac{10\sqrt{3} \times \sqrt{6}}{5\sqrt{6}} = 10$

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



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

$(b^2 - r) \frac{c}{k} = c$

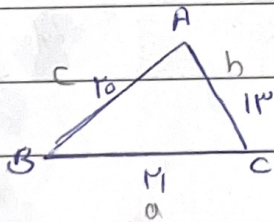


$\sin C = \frac{c}{k}$

$(b^2 - r) \frac{c}{b} = c \Rightarrow b^2 - b - r = 0$

$\sin B = \frac{b}{k}$

$\sin B = ?$



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

$149 = 1^2 + 100 - 2(1)(10) \cos B$

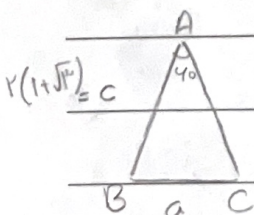
$149 = 101 - 20 \cos B$
 $48 \cos B = -54$
 $\cos B = -\frac{9}{8}$

$\cos B = \frac{1}{10}$

$\sin^2 + \cos^2 = 1$

$\sin B = \frac{4}{10}$

$\hat{A} = 90^\circ$ $b = 1$ $c = 1 + \sqrt{3}$ (2)



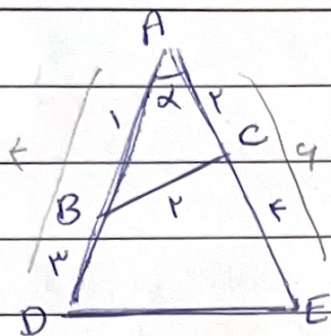
$a^2 = 1^2 + (1 + \sqrt{3})^2 - 2(1)(1 + \sqrt{3}) \cos B$

$a^2 = 1 + 1 + 1 + \sqrt{3} - 1 - \sqrt{3} = 1$

$\hat{C}, \hat{B}$

$\frac{\frac{\sqrt{3}}{2}}{\sin 90^\circ} = \frac{\sin B}{1}$

$\sin B = \frac{\sqrt{3}}{2}$ $B = 60^\circ \Rightarrow C = 180^\circ - 90^\circ - 60^\circ = 30^\circ$



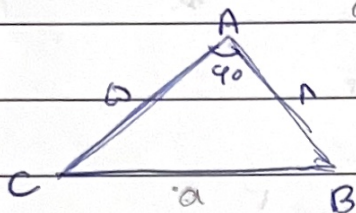
$$\cos \alpha = \frac{AC^2 + AB^2 - BC^2}{2(AB)(AC)}$$

(4) اندازه‌ی ضلع بزرگتر چقدر است؟

$$\frac{f+1-f}{2(1)(4)} = \frac{1^2 + 4^2 - DE^2}{2(4)(1)} \Rightarrow 11 = 17 - DE^2$$

$$DE^2 = 17 - 11 = 6$$

$$DE = \sqrt{6}$$



$$a^2 = 1^2 + 4^2 - 2(1)(4)\cos \alpha \quad a^2 = 17 \quad a = \sqrt{17} \quad r = BC \text{ (فرض)} \quad \alpha = 90^\circ$$

$$S = \frac{1}{2} \times 1 \times 4 \times \sin 90^\circ = 2$$

(ب) مساحت ضلع؟

$$\frac{(b+c)^2 - a^2}{4bc \cos A}$$

(1) ضلع ABC

$$\frac{b^2 + c^2 + 2bc - a^2}{4bc \cos A}$$

$$= \frac{\cos A \cdot 2bc + 2bc}{4bc \cos A} = \frac{2bc(\cos A + 1)}{4bc \cos A} = \frac{\cos A + 1}{2 \cos A}$$

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

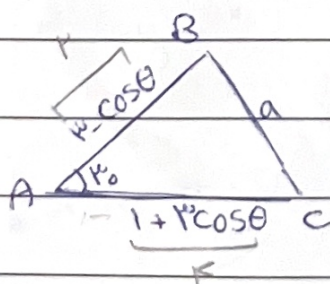
نسبت ساینوس

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

$$a^2 + b^2 - c^2 = a^2 + a^2 b - a^2 c$$

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

$$\frac{b^2 + c^2 - a^2}{\cos A \times 2bc} = -bc \Rightarrow \cos A = -\frac{1}{2}$$



$$\frac{1}{2} \times (1 - \cos \theta) \times (1 + 4 \cos \theta) \times \frac{1}{2} = 1 \quad r = \text{مساحت ضلع}$$

$$1 + 4 \cos \theta - \cos \theta - 4 \cos^2 \theta = 1 \quad r = \text{مقدار } a^2$$

$$\cos \theta = 1 \quad \cos \theta = \frac{1}{2}$$

$$a^2 = 1^2 + 4^2 - 2(1)(4)\cos \theta = 17 - 8\cos \theta$$