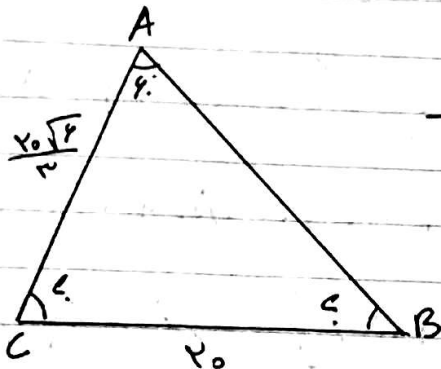


A دوزی

۱۳ تلف

۲۰ ساری رضوی

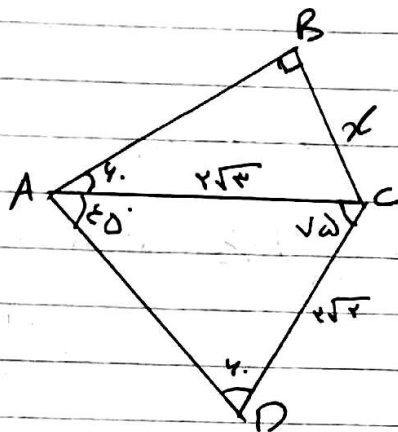


$$\frac{10}{\sin A} = \frac{10\sqrt{3}}{\sin B} \Rightarrow \frac{10}{\sqrt{3}} = \frac{10\sqrt{3}}{\sin B} \Rightarrow \sin B = \frac{\sqrt{3} \times \sqrt{3}}{10} = \frac{3}{10}$$

$$\sin B = \frac{10\sqrt{3}}{10} = \frac{\sqrt{3} \times \sqrt{3}}{10} = \frac{3}{10}$$

$$\hat{B} + \hat{C} = 120 \rightarrow 120 - 90 = 30 = \hat{C}$$

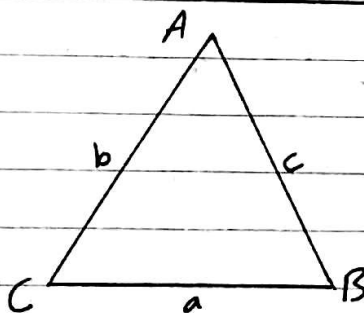
$$B = 90^\circ$$



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

$$\frac{10\sqrt{3}}{\frac{\sqrt{3}}{2}} = 10 = \frac{AC}{\sin 45^\circ} \rightarrow \frac{AC}{\frac{\sqrt{2}}{2}} = 10 \Rightarrow AC = 5\sqrt{2}$$

$$\frac{10\sqrt{3}}{1} = \frac{x}{\frac{\sqrt{3}}{2}} \rightarrow 10\sqrt{3} \times \frac{\sqrt{3}}{2} = x \Rightarrow x = 15$$



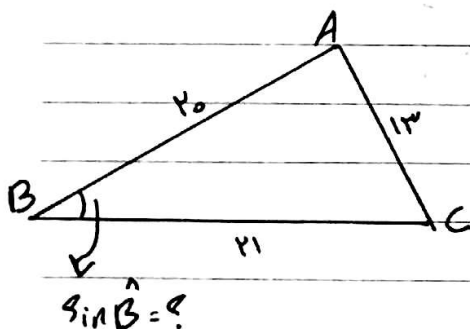
$$(b^2 - r) \frac{\sin C}{\sin B} = c$$

$$\frac{b}{\sin B} = \frac{c}{\sin C} \rightarrow \frac{\sin C}{\sin B} = \frac{c}{b}$$

$$(b^2 - r) \frac{c}{b} = c \rightarrow \frac{(b^2 - r)}{b} = 1 \rightarrow (b^2 - r) = b$$

$$b^2 - b - r = 0 \rightarrow -1 \text{ root}$$

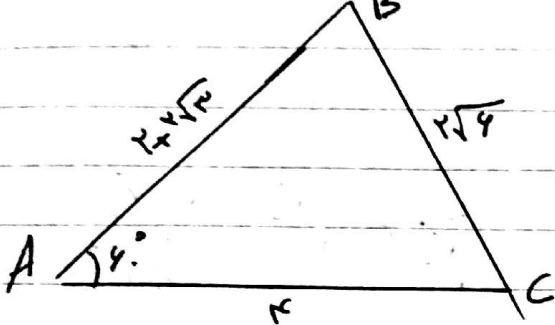
$$b = 2$$



$$\cos B = \frac{a^2 + c^2 - b^2}{2ac} = \frac{4 + 4 - 16}{16} = -0.5$$

$$\sin^2 B + \cos^2 B = 1 \rightarrow 0.25 + \sin^2 B = 1$$

$$\sin^2 B = 0.75 \rightarrow \sin B = 0.87$$



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

$$a^2 = (r + r\sqrt{r})^2 + 14 - (1 + 1\sqrt{r}) \times r \quad (4)$$

$$\frac{r}{\sin B} = \frac{r\sqrt{r}}{\frac{r\sqrt{r}}{r}} \rightarrow \frac{r\sqrt{r} \cdot r}{r} = r\sqrt{r}$$

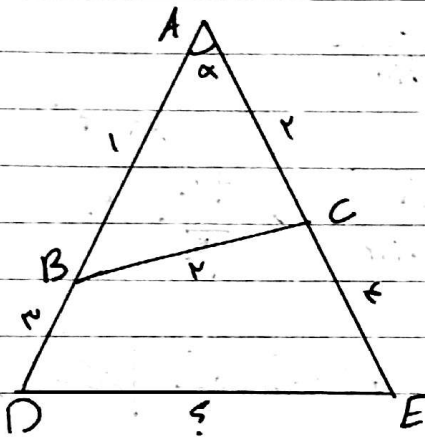
$$r + 14 + 1\sqrt{r} + 14 - 1\sqrt{r} = 28$$

$$a^2 = r^2 \rightarrow a = r\sqrt{r}$$

$$\frac{r}{\sin B} = r\sqrt{r} \rightarrow \sin B = \frac{\sqrt{r}}{r}$$

$$B = 45^\circ$$

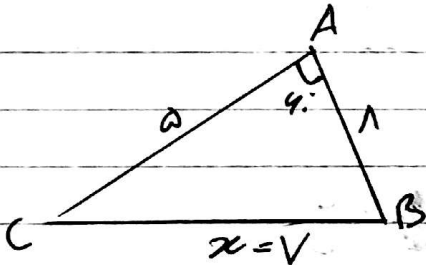
$$C = 45^\circ$$



$$r = r + 1 - r \cos \alpha \rightarrow \cos \alpha = \frac{1}{r} \quad (4)$$

$$(\overline{DE})^2 = 14 + r^2 - 2(r)(1) \times \frac{1}{r} = a^2 - 14 = r$$

$$DE = \sqrt{r} \quad (4)$$



$$x^2 = r + 1 - 2(r)(1) \left(\frac{1}{r}\right) = r \rightarrow x = \sqrt{r} \quad (4)$$

$$S_{ABC} = \frac{1}{2} \times a \times 1 \times \frac{\sqrt{r}}{r} = \frac{1}{2} \sqrt{r} \quad (4)$$

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

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

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

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

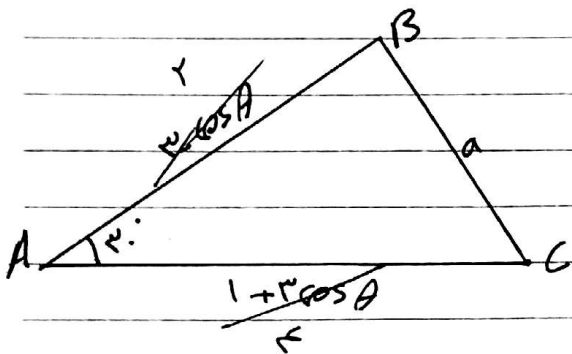
$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

(4)

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

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

$$\rightarrow \cos A = -\frac{1}{2} \rightarrow A^{\wedge} = 120^{\circ}$$



$$S = \frac{1}{2} bc \sin A$$

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

$$(r - \cos \theta)(1 + r \cos \theta) = 1$$

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

$$r \cos^2 \theta - 1 \cos \theta + 1 = 0 \rightarrow \cos \theta = \frac{1}{r} \checkmark$$

$$\cos \theta = \frac{1}{r} \rightarrow \theta = \cos^{-1} \left(\frac{1}{r} \right)$$

$$a^r = b^r + c^r - 2bc \cos A \rightarrow r^2 + 1 - 1 \sqrt{r} = r^2 - 1 \sqrt{r} = a^r$$

$$a = \sqrt{r^2 - 1 \sqrt{r}}$$

M