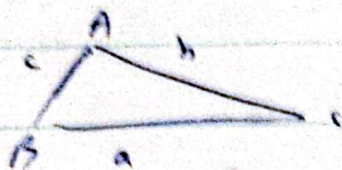


Law of Sines

2. آفرین

نکته

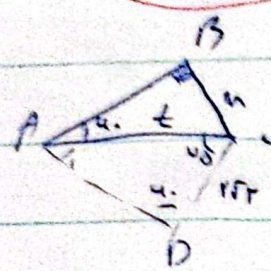


$$\hat{A} = 11. - 11. = 4. \quad B = a = 1.$$

1) 2)

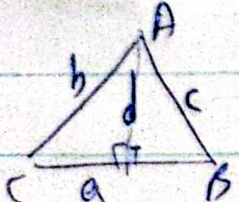
$$\frac{a}{\sin A} = \frac{b}{\sin B} \Rightarrow \frac{1}{\sin 4} = \frac{r\sqrt{4}}{\sin B} \Rightarrow \frac{1}{\frac{1}{2}} = \frac{r\sqrt{4}}{\sin B} \Rightarrow \frac{2}{1} = \frac{r\sqrt{4}}{\sin B} \Rightarrow \frac{2}{1} = \frac{r\sqrt{4}}{\sin B}$$

$$\sin B = \frac{r\sqrt{4}}{2} = \frac{4 \cdot \sqrt{4}}{2} = 4 \cdot \sqrt{4} = 4 \cdot 2 = 8 \quad \text{و } \hat{A} = 11. - 1.0 = \sqrt{10}$$



$$A_1 = 11. - (4 + 10) = 50 \quad \sin \hat{C} = \frac{r\sqrt{2}}{\sin 20} = \frac{t}{\sin 4} \Rightarrow \frac{r\sqrt{2}}{\frac{1}{2}} = \frac{t}{\frac{1}{2}} \Rightarrow t = r\sqrt{2}$$

$$\triangle ABC \Rightarrow \frac{t}{\sin B} = \frac{m}{\sin A} \Rightarrow \frac{r\sqrt{2}}{\sin 4} = \frac{m}{\frac{1}{2}} \Rightarrow m = \frac{r\sqrt{2}}{2} = \frac{r}{\sqrt{2}}$$

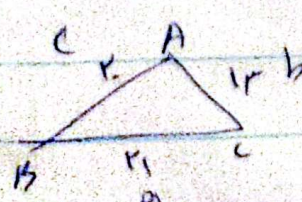


$$(b^2 - r) \frac{\sin C}{\sin B} = c \cdot \frac{\sin C}{\sin B}$$

3) 4)

$$\frac{b^2 - r}{\sin B} = \frac{c}{\sin C} \Rightarrow \frac{b^2 - r}{\frac{d}{c}} = \frac{c}{\frac{d}{b}} \Rightarrow \frac{b^2 - r}{b} = \frac{c}{c}$$

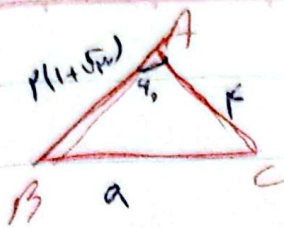
$$b^2 - r = b \Rightarrow b^2 - b - r = 0 \quad (b - r)(b + 1) \quad \left[\begin{array}{l} b = r \\ b = -1 \end{array} \right]$$



$$\cos B = \frac{a^2 + c^2 - b^2}{2ac} \Rightarrow \cos B = \frac{(11)^2 + (11)^2 - (11)^2}{2(11)(11)}$$

5) 6)

$$\cos B = \frac{221 + 221 - 199}{2 \cdot 221} = \frac{401}{442} = \frac{1}{1} \Rightarrow \sin B = 1 - \cos B = \frac{4}{11}$$



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

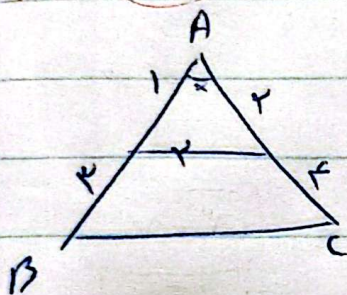
$$a^2 = 14 + 2(1+3+4\sqrt{2}) - 2 \times 2 \times 2(1+\sqrt{2}) \times \frac{1}{2}$$

$$a^2 = 14 + 2 + 14 + 8\sqrt{2} - 4 - 8\sqrt{2} \Rightarrow a^2 = 12$$

$$a = \sqrt{12} \Rightarrow a = 2\sqrt{3}$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} \Rightarrow \frac{2\sqrt{3}}{\sin 4} = \frac{2}{\sin B} \Rightarrow \frac{2\sqrt{3}}{\frac{1}{2}} = \frac{2}{\sin B} \Rightarrow \sqrt{3} = \frac{1}{\sin B}$$

$$\sin B = \frac{1}{\sqrt{3}} \Rightarrow B = \sin^{-1}\left(\frac{1}{\sqrt{3}}\right) \Rightarrow B = \sin^{-1}\left(\frac{\sqrt{3}}{3}\right) \Rightarrow B = 30^\circ$$

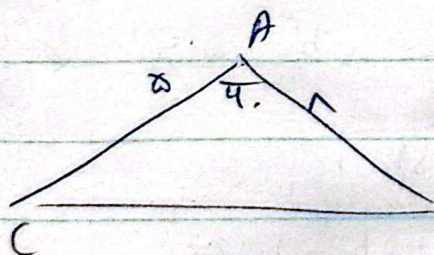


$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\Rightarrow \cos A = \frac{(1)^2 + (1)^2 - (1)^2}{2(1)(1)}$$

$$\cos A = \frac{1+1-1}{2} \Rightarrow \cos A = \frac{1}{2}$$

$$BC = \sqrt{a^2 + b^2 - 2ab \cos A} \Rightarrow \sqrt{14 + 14 - 2 \times 2 \times 2 \times \frac{1}{2}} \Rightarrow \sqrt{12}$$



$$BC^2 = a^2 + b^2 - 2ab \cos A$$

$$BC = \sqrt{4 + 1 + 2 \times 2 \times 1 \times \frac{1}{2}} = \sqrt{6}$$

$$S = \frac{1}{2} ab \sin C \Rightarrow \frac{1}{2} \times 2 \times 1 \times \frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2}$$

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

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

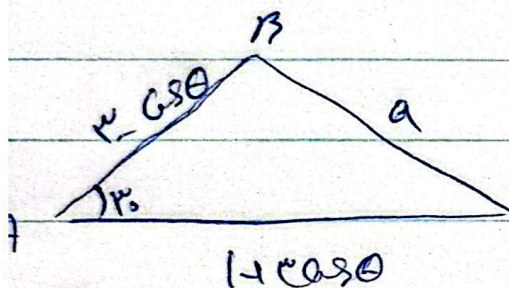
$$\Rightarrow \frac{b^2 + c^2 - a^2 + 2bc}{bc(c+A+1)}$$

$$\frac{rbc \cos A + rbc}{bc(\cos A + 1)} = \frac{rbc(\cos A + 1)}{bc(\cos A + 1)} = \boxed{r}$$

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos C \Rightarrow a^2 + b^2 - c^2 = 2ab \cos C$$

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

$$a^2 = b^2 + c^2 - 2bc \cos A \Rightarrow \cos A = -\frac{1}{r} \Rightarrow \hat{A} = 114^\circ$$



$$S = \frac{1}{2} ab \sin C$$

$$S = \frac{1}{2} \times (r - \cos 30^\circ)(1 + \cos 30^\circ) \times \frac{1}{r} = r$$

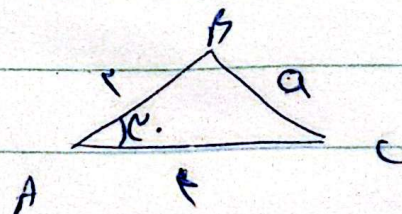
$$r - \cos 30^\circ + r \cos 30^\circ - \cos 30^\circ = 1$$

$$r \cos 30^\circ - 1 \cos 30^\circ + 0 = 0$$

$$\cos 30^\circ - 1 \cos 30^\circ + 1 = 0 \Rightarrow (\cos 30^\circ - 1)(\cos 30^\circ - 1) = 0$$

$$\cos 30^\circ = \frac{r}{1} = 1 \Rightarrow r = 1$$

$$\cos 30^\circ = \frac{1}{r} > 1 \Rightarrow r = \frac{1}{\cos 30^\circ}$$



$$a^2 = b^2 + c^2 - 2bc \cos A \Rightarrow a^2 = 1 + 1 - 2 \times 1 \times 1 \times \cos 120^\circ \Rightarrow a = \sqrt{3}$$