

$\hat{A} = 110^\circ, 14^\circ, 4^\circ$

1.

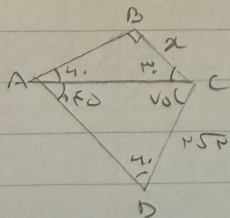
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{10\sqrt{4}}{\sqrt{5}} = \frac{10}{\sqrt{5}} = \frac{10\sqrt{4}}{\sqrt{5} \sin B} \rightarrow 14 \cdot \sin B = 40\sqrt{5}$$

$$\sin B = \frac{40\sqrt{5}}{100} = \frac{\sqrt{5}}{10} \rightarrow B = 40^\circ$$

$90^\circ < B < 180^\circ$

$\hat{C} = 110^\circ (40^\circ + 30^\circ) = 180^\circ$



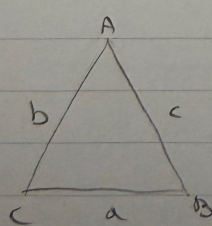
$\hat{A}_1 = 40^\circ$

$$\frac{a}{\sin A_1} = \frac{d}{\sin B} \Rightarrow \frac{10\sqrt{4}}{\frac{1}{\sqrt{5}}} = \frac{10\sqrt{4} \cdot \sqrt{5}}{\sqrt{5}}$$

2.

$$10\sqrt{4} = \frac{10\sqrt{4} \cdot \sqrt{5}}{\sqrt{5}} \rightarrow d = \frac{10\sqrt{4} \cdot \sqrt{5}}{\sqrt{5}} = 10\sqrt{4}$$

$$\frac{b}{\sin B} = \frac{a}{\sin A} \Rightarrow \frac{10\sqrt{4}}{1} = \frac{10}{\sqrt{5}} \rightarrow 2 = 10$$



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

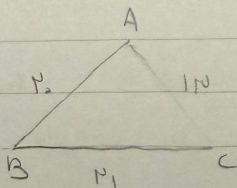
3.

$$c = b \frac{\sin C}{\sin B} \Rightarrow b \cdot b' - p$$

$$c = (b' - p) \frac{\sin C}{\sin B} \Rightarrow b' - p = 10$$

$$(b' - p)(b + 1) = 10 \Rightarrow b' - p = 10$$

أبلا منوننا



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

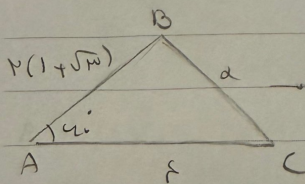
$$(17)^2 = (14)^2 + (10)^2 - 2(14)(10) \cos \hat{B}$$

$$149 = 141 + 100 - 280 \cos \hat{B}$$

$$170 \cos \hat{B} = 41 \quad \cos \hat{B} = \frac{41}{170} \approx \frac{1}{4}$$

$$\sin^2 \hat{B} = 1 - \cos^2 \hat{B} \rightarrow \sin^2 \hat{B} = 1 - \frac{1}{16} = \frac{15}{16}$$

$$\sin \hat{B} = \frac{\sqrt{15}}{4}$$



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

$$10^2 = 14^2 + 17^2 - 2(14)(17) \cos \hat{A}$$

$$100 = 196 + 289 - 476 \cos \hat{A}$$

$$\frac{a}{\sin \hat{A}} = \frac{b}{\sin \hat{B}} = \frac{c}{\sin \hat{C}} \rightarrow \frac{10}{\sin \hat{C}} = \frac{17}{\frac{\sqrt{15}}{4}} \rightarrow \sin \hat{C} = \frac{4\sqrt{15}}{17} \quad . \text{ج}$$

$$\sin \hat{B} = \frac{4\sqrt{15}}{17} \rightarrow \sqrt{\frac{1}{16}} = \frac{\sqrt{15}}{4} \rightarrow \hat{B} = 40^\circ$$

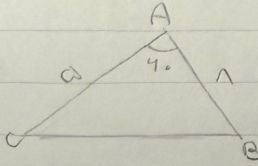
$$\hat{C} = 180 - (40 + 40) = 100^\circ$$

$$BC^2 = AB^2 + AC^2 - 2(AB)(AC) \cos \hat{A} \rightarrow 10^2 = 14^2 + 17^2 - 2(14)(17) \cos \hat{A} \quad . \text{د}$$

$$100 = 196 + 289 - 476 \cos \hat{A}$$

$$DE^2 = AD^2 + AE^2 - 2(AD)(AE) \cos \hat{A} \rightarrow DE^2 = 14^2 + 17^2 - 2(14)(17) \cos \hat{A}$$

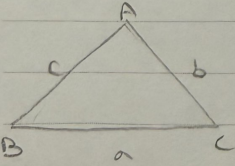
$$DE^2 = 100 \rightarrow DE = \sqrt{100} = 10$$



$$BC^2 = AB^2 + AC^2 - 2(AB)(AC)\cos A$$

$$BC^2 = 4^2 + 10^2 - 2 \times 4 \times 10 \times \cos 40^\circ \rightarrow BC = \sqrt{89} \approx 9.43$$

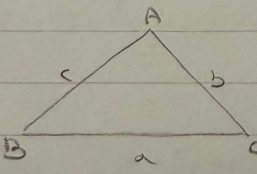
$$\frac{1}{2} \times AB \times AC \times \sin A \rightarrow \frac{1}{2} \times 4 \times 10 \times \sin 40^\circ = 10.57$$



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

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

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



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

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

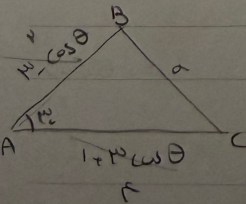
$$b^2 + c^2 + bc = b^2 + c^2 + 2bc \cos A$$

$$2bc \cos A = bc \rightarrow \cos A = \frac{1}{2}$$

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

$$1 - \cos^2 \theta = 1 \cos^2 \theta = 0 \rightarrow \cos \theta = 0 \rightarrow \theta = 90^\circ$$

$$\cos \theta = t \rightarrow 1 - t^2 = 1 + t^2 \rightarrow t^2 = 1 \rightarrow t = 1 \rightarrow \theta = 0^\circ$$



$$a^2 = AB^2 + AC^2 - 2(AB)(AC)\cos 120^\circ$$

$$a^2 = 8^2 + 14^2 - 2 \times 8 \times 14 \times \cos 120^\circ = 100 + 196 + 112 = 408$$