

$$A = 110^\circ - 120^\circ = 20^\circ$$

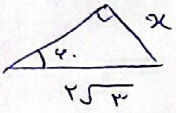
$$\frac{20}{\frac{\sqrt{31}}{2}} = \frac{2 \cdot \sqrt{6}}{\frac{3}{\sin B}} \Rightarrow \sin B = \frac{\cancel{2} \cdot \sqrt{6} \times \frac{\sqrt{31}}{3}}{\frac{3}{\cancel{2}}}$$

$$\Rightarrow \frac{\sqrt{11}}{6} = \frac{\sqrt{2}}{4} \Rightarrow \hat{B} = 45^\circ$$

$$\hat{C} = 120^\circ - 45^\circ = 75^\circ$$

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$$A = 110^\circ - (20^\circ + 75^\circ) = 15^\circ$$

$$AC = 4 \times \frac{\sqrt{31}}{2} = 2\sqrt{31}$$


$$\sin 40^\circ = \frac{\sqrt{3}}{2} = \frac{m}{2\sqrt{3}} \Rightarrow m = 3$$

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

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

$$\Rightarrow b^2 - r = b \Rightarrow b^2 - b - r = 0 \Rightarrow (b-2)(b+1) = 0$$

$$\Rightarrow b = 2 \checkmark \quad b = -1 \times$$

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

$$149 = 400 + 441 - 140 \cos B$$

$$140 \cos B = 472 \Rightarrow \cos B = \frac{4}{5}$$

$$\sin = \sqrt{\frac{12}{25} - \frac{16}{25}} = \frac{3}{5}$$

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الف) $a^2 = 16 + 4 + 12 + 1\sqrt{3} \times \frac{1}{4} \times -2(1 + 1\sqrt{3})$

$$32 + 1\sqrt{3} - 1 - 1\sqrt{3} = 24 = a^2 \Rightarrow a = 2\sqrt{6}$$

ب) $\frac{4}{\sin B} = \frac{2\sqrt{6}}{\sin 40^\circ} = \frac{\sqrt{31}}{2} \times 4 = \frac{\sqrt{31}}{\sqrt{6}} = \frac{\sqrt{2}}{1} \Rightarrow B = 45^\circ$

$$C = 110^\circ - (20^\circ + 45^\circ) = 45^\circ$$

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$$K = K + 1 - K \cos \alpha \Rightarrow \cos \alpha = \frac{1}{K}$$

$$a'' = 14 + 14 - K \times \frac{1}{K} \Rightarrow a'' = 14 + 14 - 12 = K$$

$$a'' = \sqrt{K} = 2\sqrt{10}$$

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$$\text{الف) } CB'' = 2\omega + 4K - 10 \times \frac{1}{K} = K9 \quad CB = V$$

$$\text{ب) } \frac{1}{K} \times \omega \times 1 \times \frac{\sqrt{11}}{K} = 10\sqrt{11}$$

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

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

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$$\frac{a^3 + b^3 - c^3}{a + b - c} = a^2 \Rightarrow \cancel{a^3} + \cancel{b^3} - \cancel{c^3} = \cancel{a^3} + a^2b - a^2c$$

$$\Rightarrow (b-c)(\cancel{b^2} + \cancel{c^2} + bc) = a^2(b-c) \Rightarrow \cancel{b^2} + \cancel{c^2} + bc = \cancel{b^2} + \cancel{c^2}$$

$$-2bc \cos A \Rightarrow \cos A = \frac{-1}{2} \Rightarrow \hat{A} = \frac{4\pi}{3} = 120^\circ$$

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$$K = (\omega - \cos \theta)(1 + 11 \cos \theta) \times \frac{1}{K} \Rightarrow 1 = \omega + 11 \cos \theta - \cos \theta - 11 \cos^2 \theta$$

$$\Rightarrow 11 \cos^2 \theta - 10 \cos \theta + \omega = 0$$

$$\frac{1 \pm \sqrt{4K - K \times 10}}{2}$$

$$\left\{ \begin{array}{l} \cos \theta = \frac{\omega}{K} \quad \bar{u} \bar{u} \bar{e} \\ \cos \theta = 1 \quad \bar{u} \bar{u} \end{array} \right. \quad 10.$$

$$\theta = 120^\circ$$

$$a'' = K + 14 - 1 \times 1 \times K \times \frac{\sqrt{11}}{K} = 12 - 11\sqrt{11}$$

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