

19/5 آفرین

بنام خدا

پروانه ملان

DATE / / SUBJECT:

$$B+C, 120^\circ \rightarrow A, 70^\circ \rightarrow \frac{BC}{\sin A} = \frac{AC}{\sin B} \rightarrow \frac{10}{\sqrt{3}} = \frac{r \cdot \sqrt{3}}{\sin B} \rightarrow \frac{10}{\sqrt{3}} = \frac{\sqrt{3}}{\sin B} \rightarrow \sin B = \frac{\sqrt{3}}{10} \rightarrow \textcircled{1}$$

$$\boxed{B = 40^\circ} \rightarrow \boxed{C = 70^\circ}$$

B = 120° قوی

$$\frac{CD}{\sin A} = \frac{AC}{\sin 40^\circ} \rightarrow \frac{r \sqrt{3}}{\sqrt{3}} = \frac{AC}{\frac{\sqrt{3}}{10}} \rightarrow AC = r \sqrt{3} \rightarrow \textcircled{2}$$

$$BC = AC \sin 40^\circ = r \sqrt{3} \times \frac{\sqrt{3}}{10} = r = 10 \checkmark$$

$$(b^2 - r^2) \frac{\sin \hat{C}}{\sin \hat{B}} = c \div \sin \hat{C} \rightarrow \frac{b^2 - r^2}{\sin \hat{B}} = \frac{c}{\sin \hat{C}} = \frac{b}{\sin \hat{B}} \rightarrow b^2 - r^2 = b \rightarrow \textcircled{3}$$

$$b^2 - b - r^2 = 0 \rightarrow \boxed{b = 2} \checkmark$$

b = 1 قوی

$$(r_1)^2 + (r_2)^2 - r(r_1)(r_2) \times \cos \hat{B} = (10)^2 \rightarrow 14^2 + 4^2 - 14 \cdot 4 \cdot \cos \hat{B} = 100 \rightarrow \textcircled{4}$$

$$14^2 + 4^2 - 14 \cdot 4 \cdot \cos \hat{B} = 100 \rightarrow \cos \hat{B} = \frac{4 \cdot 14}{14 \cdot 4} = \frac{14}{14} = 1 \rightarrow \sin \hat{B} = \frac{1}{1} \checkmark$$

$$a^2 = b^2 + c^2 - 2bc \cos \hat{A} \rightarrow a^2 = 14^2 + 4^2 - 14(1 + \sqrt{3}) \times \frac{1}{2} = \textcircled{5} \text{ (ن)}$$

$$22 + 16 - 14 - 14\sqrt{3} = 24 \rightarrow a = \sqrt{24} = 2\sqrt{6} \checkmark$$

$$\frac{r}{\sin B} = \frac{r \sqrt{3}}{\frac{\sqrt{3}}{10}} \rightarrow \sin B = \frac{\sqrt{3}}{10} \rightarrow \boxed{B = 40^\circ} \rightarrow \hat{C} = 180 - (40 + 70) = 70^\circ \rightarrow \textcircled{6}$$

مکمل

$$ABC: AC^2 + AB^2 - 2(AB)(AC)\cos\alpha = BC^2 \rightarrow 4^2 + 1^2 - 2 \times 4 \times 1 \times \cos\alpha = 5^2 \rightarrow \cos\alpha = \frac{1}{4} \quad (9)$$

$$\rightarrow DE^2 = AD^2 + AE^2 - 2(AD)(AE)\cos\alpha \rightarrow DE^2 = 14^2 + 9^2 - 2 \times 14 \times 9 \times \frac{1}{4} = 10 \rightarrow \boxed{DE = \sqrt{10}}$$

$$BC^2 = 4^2 + 1^2 - 2 \times 4 \times 1 \times \frac{1}{4} = 5 \rightarrow \boxed{BC = \sqrt{5}} \quad (7)$$

$$\angle A = \frac{1}{2} \times AB \times AC \times \sin\gamma = \frac{1}{2} \times 4 \times 1 \times \sin\gamma = \frac{1}{2} \times 4 \times 1 \times \frac{\sqrt{3}}{2} = \sqrt{3} \rightarrow \boxed{\angle A = 60^\circ}$$

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

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

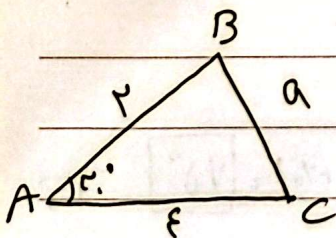
$$\begin{aligned} \rightarrow a^2 &= b^2 + c^2 + bc \\ a^2 &= b^2 + c^2 - 2bc\cos A \end{aligned} \rightarrow -2bc\cos A = bc \rightarrow \boxed{\cos A = -\frac{1}{2}} \quad (3)$$

$$\boxed{A = 120^\circ}$$

$$\frac{1}{2} \times (r - c\cos\theta)(1 + c\cos\theta) \times \frac{1}{r} = 2 \rightarrow 1 = r + c\cos\theta - c\cos\theta - c\cos^2\theta \rightarrow \quad (4)$$

$$d = 1c\cos\theta - r\cos\theta \rightarrow -r\cos\theta + 1c\cos\theta - d = 0 \rightarrow \cos\theta = \frac{d}{c-r}$$

$$\boxed{\cos\theta = 1} \rightarrow$$



$$\rightarrow a^2 = r^2 + c^2 - 2rc\cos\theta = 14^2 + 9^2 - 2 \times 14 \times 9 \times \frac{1}{2} = 10 \rightarrow \boxed{a = \sqrt{10}}$$

$$a^2 = r^2 + c^2 - 2(14)(9)(\frac{\sqrt{3}}{2}) = 10 - 18\sqrt{3}$$