

19.0

۳ سینوس

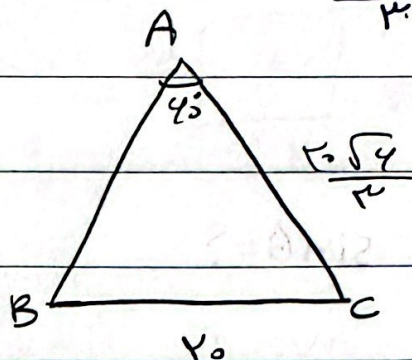
دوازدهم A

مریم توفیقی

$$BC = 20 \quad \hat{B} + \hat{C} = 110^\circ \quad AC = \frac{20\sqrt{4}}{3}$$

(سوال ۱)

$$\hat{B} = ? \quad \hat{C} = ?$$



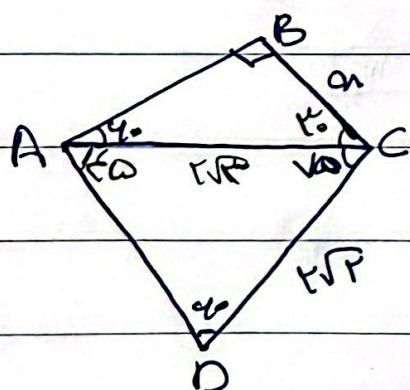
$$\frac{BC}{\sin A} = \frac{AC}{\sin B}$$

(۲)

$$\rightarrow \frac{20}{\frac{20\sqrt{4}}{3}} = \frac{20\sqrt{4}}{3} \rightarrow \frac{\sqrt{4}}{4} = \sin \hat{B} \Rightarrow \sin \hat{B} = \frac{\sqrt{4}}{4} \Rightarrow \hat{B} = 45^\circ$$

$$\hat{C} = 110 - 45 = 65^\circ$$

(سوال ۲)



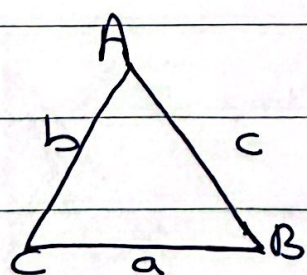
$$\frac{20\sqrt{4}}{\sin 40^\circ} = \frac{AC}{\sin 40^\circ} \rightarrow \frac{20\sqrt{4}}{\frac{\sqrt{4}}{4}} = \frac{AC}{\frac{\sqrt{4}}{4}} \Rightarrow AC = 20\sqrt{4}$$

(۲)

$$n = BC \rightarrow BC = \frac{r}{AC} \times \sin 40^\circ \rightarrow BC = \frac{20\sqrt{4}}{4} \times \frac{\sqrt{4}}{4}$$

✓ = 3

(سوال ۳)



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

$$\frac{c}{\sin \hat{C}} = \frac{b}{\sin \hat{B}} \Rightarrow c = b \frac{\sin \hat{C}}{\sin \hat{B}} \quad (1)$$

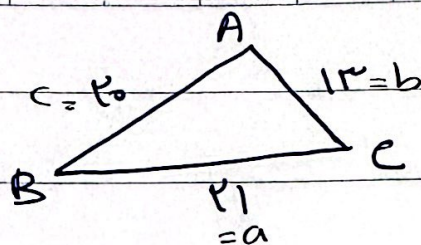
$$c = (b-r) \frac{\sin \hat{C}}{\sin \hat{B}} \quad (2)$$

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

$$(b-r)(b+r) = 0 \Rightarrow b=r$$

b=1
عق

آپادانا



$$\sin \hat{B} = \frac{r}{a}$$

(سوال ٤)

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

$$\Rightarrow 149 = \frac{r^2 + r^2 - (2 \times r \times r) \times \cos \hat{B}}{1 \times 1}$$

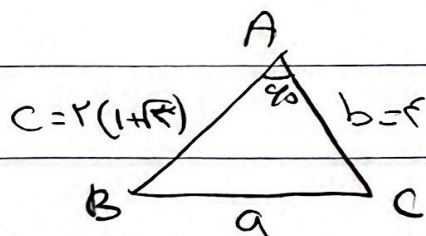
$$\Rightarrow 149 = \frac{r^2 + r^2 - (2 \times r \times r) \times \cos \hat{B}}{1 \times 1}$$

$$\cos \hat{B} = \frac{49}{149} = \frac{r}{a}$$

$$\cos \hat{B} + \sin \hat{B} = 1 \rightarrow \frac{14}{149} + \sin \hat{B} = 1 \rightarrow \sin \hat{B} = \frac{9}{149} \rightarrow \boxed{\sin \hat{B} = \frac{9}{149}}$$

$$b = r \quad c = r(1 + \sqrt{r}) \quad \hat{A} = 40^\circ$$

(سوال ٥)



a = r (نکته)

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

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

$$\Rightarrow a^2 = 14 + 14 + 14\sqrt{r} - 14 - 14\sqrt{r} = 14 \Rightarrow a = \sqrt{14}$$

$$= \boxed{\sqrt{14}}$$

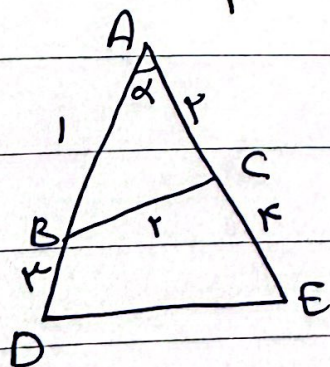
$$\frac{a}{\sin \hat{A}} = \frac{b}{\sin \hat{B}} \Rightarrow \frac{\sqrt{14}}{\sin 40^\circ} = \frac{r}{\sin \hat{B}}$$

$$\hat{C} = 50^\circ \quad \hat{B} = 50^\circ$$

$$\sqrt{14} \sin \hat{B} = \sqrt{14}$$

$$\Rightarrow \sin \hat{B} = \frac{\sqrt{14}}{\sqrt{14}} \Rightarrow \boxed{\hat{B} = 90^\circ} \quad \hat{C} = 180^\circ - (40^\circ + 90^\circ) = \boxed{50^\circ}$$

(سوال ٦)



$$DE = r$$

$$BC^2 = AB^2 + AC^2 - 2AB \times AC \times \cos \alpha$$

$$\Rightarrow r^2 = r^2 + r^2 - (2 \times r \times r \times \cos \alpha) \Rightarrow \cos \alpha = \frac{1}{2}$$

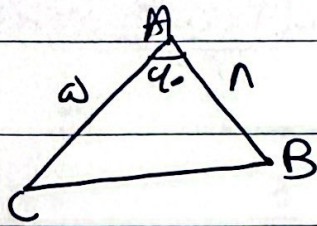
* لا بد من معرفة r

تبادلت

$$DE^2 = AD^2 + AE^2 - (2 \times AD \times AE \times \cos \alpha)$$

$$\Rightarrow 14 + 34 - (2 \times \cancel{7} \times 4 \times \frac{1}{2}) = 52 - 14 = 38 \Rightarrow DE = \sqrt{38} = \boxed{\sqrt{38}}$$

سوال (٧٠)



الف) مساحة $\triangle ABC$

$$BC^2 = AB^2 + AC^2 - 2 \times AB \times AC \times \cos 45^\circ$$

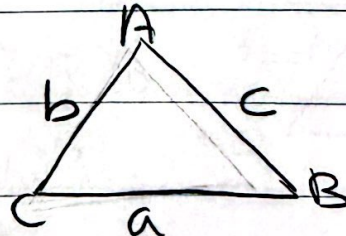
$$\Rightarrow BC^2 = \frac{16}{14} + \frac{49}{14} - (2 \times \cancel{4} \times \cancel{7} \times \frac{1}{2}) = \frac{65}{14} - 14 = \frac{65 - 196}{14} = \frac{-131}{14} \Rightarrow BC = \sqrt{\frac{65}{14}} = \boxed{\sqrt{\frac{65}{14}}}$$

(٧)

ب) $\triangle ABC$ محيطه

$$S = \frac{1}{2} \times AB \times AC \times \sin 45^\circ \Rightarrow S = \frac{1}{2} \times 4 \times 7 \times \frac{\sqrt{2}}{2} = \boxed{7\sqrt{2}}$$

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



سوال (٨١)

$$\Rightarrow a^2 = b^2 + c^2 - 2bc \cos A \Rightarrow (b+c)^2 - a^2 = b^2 + c^2 + 2bc - 2bc \cos A + 2bc \cos A = 2bc(1 + \cos A)$$

(٧)

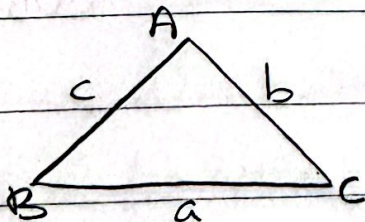
$$\Rightarrow \frac{(b+c)^2 - a^2}{bc(\cos A + 1)} = \frac{2bc(\cos A + 1)}{bc(\cos A + 1)} = \boxed{2}$$

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

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

(١٠)

سوال (٩١)



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

$$\Rightarrow a^2 + b^2 - c^2 = a^2 + ab - ac$$

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

$$\Rightarrow a^2 = b^2 + c^2 - 2bc \cos A \Rightarrow \boxed{\cos A = \frac{1}{2}}$$

$$2 \cos A = -1$$

ب) $\triangle ABC$

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

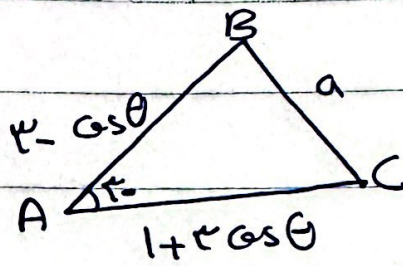
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(السؤال 10)



$$a^r = s \quad s = r$$

$$S = \frac{1}{2} \times AC \times AB \times \sin \theta$$

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

$$\Rightarrow -r \cos^2 \theta + \cos \theta + r = 1 \Rightarrow -r \cos^2 \theta + \cos \theta - 1 = 0$$

$$\cos \theta = 1$$

$$\cos \theta = \frac{1}{r} \times$$

(Y)

$$\cos \theta = 1 \rightarrow 1 + r \cos \theta = 1$$

$$\rightarrow r \cos \theta = r \quad a^r = AB^r + AC^r - r \times AB \times AC \times \cos \theta$$

$$\rightarrow a^r = \frac{14 + 8}{r_0} - (r \times 8 \times r \times \frac{1}{r}) = \boxed{r_0 - 1 \sqrt{r}}$$