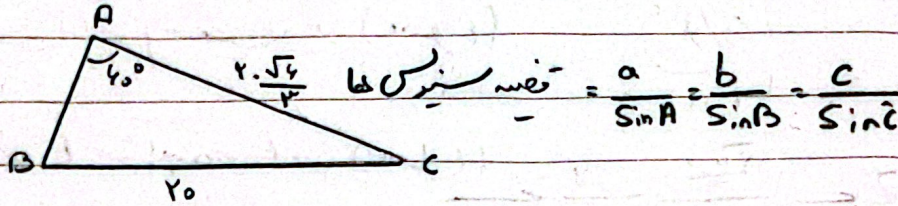


زیریں ماریاں تظیف ۱۳

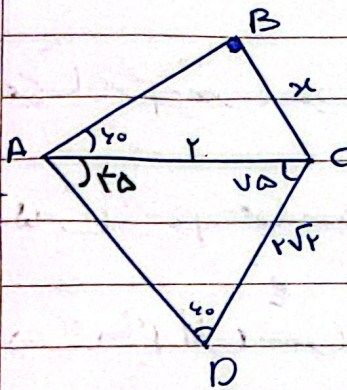
① $DC = 2$ $B + C = 120^\circ$ $AC = \frac{2\sqrt{6}}{3}$ $\hat{B} = ?$ $\hat{C} = ?$



$$\frac{2}{\sin 40^\circ} = \frac{\frac{2\sqrt{6}}{3}}{\sin B} \rightarrow \sin B = \frac{\frac{2\sqrt{6}}{3} \times \frac{3}{2}}{\sin 40^\circ} = \frac{\sqrt{6}}{\sin 40^\circ} \approx \frac{2.45}{0.64} \approx 3.83 \rightarrow B = 45^\circ$$

$$C = 180^\circ - 40^\circ - 45^\circ = 95^\circ$$

② $x = ?$



$$A_1 = 180^\circ - 120^\circ = 60^\circ$$

$$\frac{2\sqrt{3}}{\sin 60^\circ} = \frac{d}{\sin 40^\circ} \rightarrow d = 2$$

$$x = \frac{\sqrt{3}}{2} \times 2 = \sqrt{3}$$

$$AC = 2\sqrt{3}$$

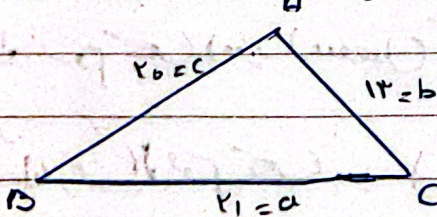
①

③ $(b^2 - 2) \frac{\sin C}{\sin B} = c$ $b = ?$

$$\frac{(b^2 - 2)c}{\sin B} = \frac{c}{\sin C} \rightarrow b^2 - 2 = b \rightarrow b^2 - b - 2 = 0 \rightarrow (b - 2)(b + 1) = 0 \rightarrow b = -1 \text{ or } b = 2$$

②

④ $\sin \hat{B} = ?$ $b^2 = a^2 + c^2 - 2ac \cos \hat{B}$



$$149 = 4 + 4 - 2(2)(2) \cos \hat{B}$$

$$149 - 8 = -8 \cos \hat{B}$$

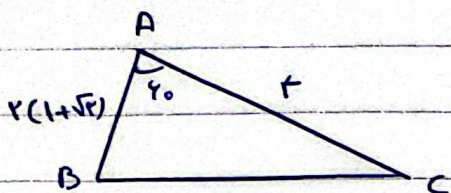
$$-402 = -8 \cos \hat{B}$$

$$\cos \hat{B} = \frac{402}{8} = 50.25$$

$$\sin \hat{B} = \frac{4}{5}$$

③

د- $b = r$ $c = r(1 + \sqrt{r})$ $A = 90^\circ$



الف) a را معلوم

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

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

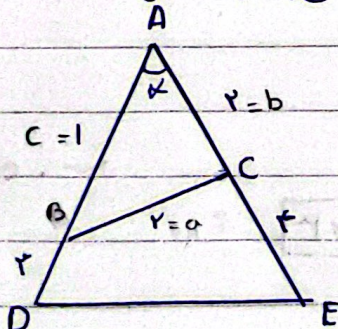
$$a^2 = r^2 + r^2 + 2r\sqrt{r} - 1 - \sqrt{r} \Rightarrow a^2 = 2r \rightarrow a = r\sqrt{2}$$

ب) C, B را معلوم: $\frac{\frac{r\sqrt{2}}{\frac{r\sqrt{2}}{r}}}{\frac{r}{\sin B}} = \frac{r}{\sin B} \rightarrow \sin B = \frac{r\sqrt{2}}{r\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \rightarrow B = 45^\circ$

$$C = 180^\circ - (45^\circ + 90^\circ) = 45^\circ$$

هـ-

خطوط برش را وصل می‌کنیم



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

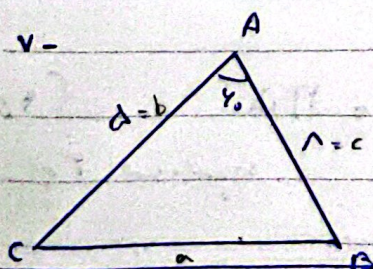
$$r^2 = r^2 + 1 - 2(r)(r) \cos A \quad r \cos A = 1 \quad \cos A = \frac{1}{r}$$

$$DE^2 = AD^2 + AE^2 - 2(AD)(AE) \times \frac{1}{r}$$

$$DE^2 = r^2 + r^2 - 2(r^2) \times \frac{1}{r} \rightarrow DE^2 = 2r^2 - 2r \rightarrow DE = r$$

$$DE = r\sqrt{10}$$

و-



الف) BC را معلوم $a^2 = b^2 + c^2 - 2bc \cos A$

$$a^2 = r^2 + r^2 - 2(r)(r) \cdot \frac{1}{r}$$

$$a^2 = r^2 \rightarrow a = r$$

ب) ABC را

$$S = \frac{1}{2} b \times c \times \sin A$$

$$\rightarrow S = r \times r \times \frac{1}{2} \times \frac{\sqrt{r}}{r} = \frac{1}{2} r\sqrt{r}$$

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

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

$$= 2$$

Subject $\frac{a}{r} + \frac{b}{r} - \frac{c}{r}$ Date

9. $\frac{a^r + b^r - c^r}{a + b - c} = a^r$ ~~$\frac{(a+b)^r - r ab(a+b) - c^r}{a+b-c}$~~

~~$\frac{(a+b)^r - c^r}{a+b-c} - r ab(a+b) = \frac{(a+b+c)(a^r + b^r + r ab + c^r + c(a+b))}{a+b-c}$~~

~~$(a+b)^r - c^r - r ab(a+b) = (a+b+c)(a^r + b^r + r ab + c^r + c(a+b))$~~

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

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

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

$(a^r + b^r - c^r) = a^r(a + b - c)$

$a^r + b^r - c^r = a^r + a^r b - a^r c$

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

$(b - c)(b^r + bc + c^r - a^r) = 0$

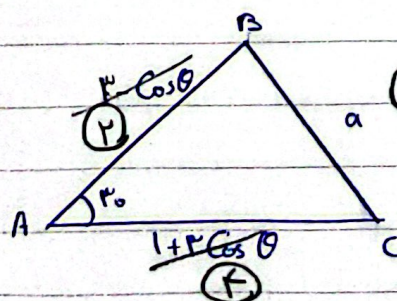
$b^r + bc + c^r - (b^r + c^r - rbc \cos A) = 0$

$bc + rbc \cos A = 0$

$bc(1 + r \cos A) = 0 \rightarrow \cos A = -\frac{1}{r}$

$A = 120^\circ$

10. $S = r$ $a^r = ?$



$S = \frac{1}{r} (r - \cos \theta)(1 + r \cos \theta) \sin \theta \cdot \frac{1}{r} = r$

$(r - \cos \theta)(1 + r \cos \theta) = \Lambda$

$r + r^2 \cos \theta - \cos \theta - r \cos^2 \theta = \Lambda$

$r \cos^2 \theta - \Lambda \cos \theta + \Lambda = 0$

$\cos^2 \theta - \Lambda \cos \theta + \Lambda = 0$

$(\cos \theta - r)(\cos \theta - \Lambda) = 0$

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

$a^r = r + \Lambda - r(\Lambda) \cos \theta \rightarrow a^r = r - \Lambda \sqrt{r}$

$a^r = \sqrt{r(\Lambda - r\sqrt{r})}$

$a = r\sqrt{\Lambda - r\sqrt{r}}$