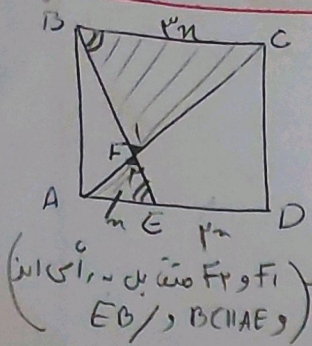


سوال ۱



$ED = 2AE$

$\frac{EF}{AF} = ?$

$BC = 3\sqrt{2} \rightarrow AC = 3\sqrt{2} \cdot \frac{\sqrt{2}}{2} = 3 \cdot 2 = 6$ و $BE = \sqrt{10} \cdot n$

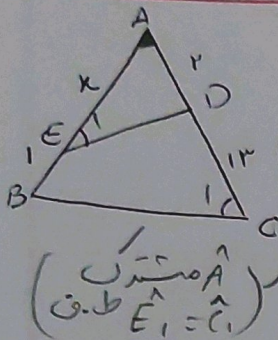
$\triangle CBF \sim \triangle AFE \rightarrow \frac{CF}{FA} = \frac{BF}{FE} = \frac{BC}{AE} = 3$

$\Rightarrow \frac{EF}{AF} = \frac{\frac{\sqrt{10}}{3} \cdot n}{\frac{\sqrt{10}}{3} \cdot n} = \frac{\sqrt{10}}{3}$

$AF = \frac{3\sqrt{10}}{3} \cdot n$

$FE = \frac{\sqrt{10}}{3} \cdot n$

سوال ۲



$\angle AED = \angle ACB$

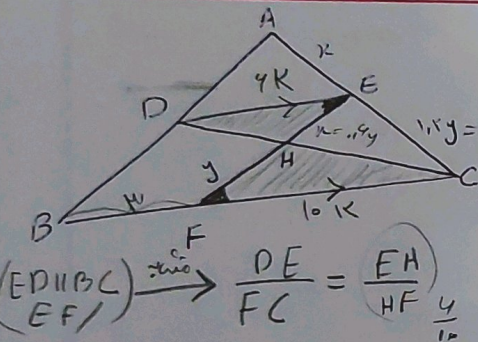
$x = ?$

$\triangle ADE \sim \triangle ABC \rightarrow \frac{AD}{AB} = \frac{AE}{AC}$

$\frac{2}{1+n} = \frac{n}{10} \rightarrow 20 = n^2 + n \rightarrow (n-4)(n+5) = 0$

غیر منفی $\rightarrow 4$ ✓

سوال ۳



$DE \parallel BC$

$3y = 5x$
 $\downarrow$
 $1.5y = x$

$BF = 3$

$BC = ?$

$AK = 18 \times \frac{3}{4} = \frac{27}{4}$

$\frac{AE}{AC} = \frac{DE}{CB} \rightarrow CB = AK \Rightarrow AK = 3$
 $K = \frac{3}{8}$

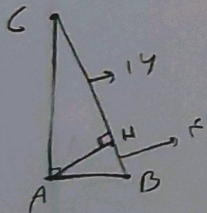
نقطه تلاقی ارتفاع ها در دایره H

طول وتر = ۲۰

۴ = کثیر الضلع H از زاویه های

? = طول اضلاع قائمه

سوال ۴

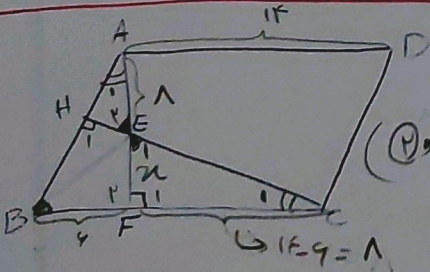


$(AB)^2 = \frac{BH}{4} \cdot \frac{BC}{20} \Rightarrow AB = 4\sqrt{5}$

$(AC)^2 = \frac{CH}{14} \cdot \frac{BC}{20} \rightarrow AC = 14\sqrt{5}$

$\Rightarrow \frac{AC}{AB} = \frac{14\sqrt{5}}{4\sqrt{5}} = 3.5$

سوال ۵



$AD = 12, BF = 4, AE = 8, AF = ?$

$\triangle ABF \sim \triangle FEC \rightarrow \frac{AF}{FC} = \frac{BF}{FE}$

$\rightarrow \frac{8+n}{8} = \frac{4}{n} \rightarrow 8n + n^2 - 32 = 0 \rightarrow (n-4)(n+8) = 0$

غیر منفی $\rightarrow 4$ ✓

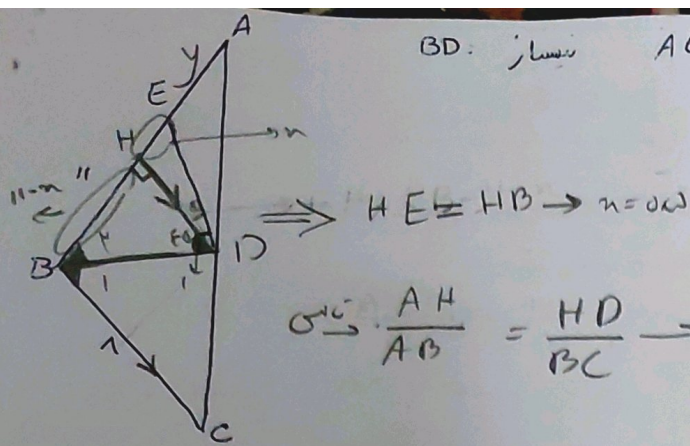
$\Rightarrow AF = 8 + 4 = 12$

$\hat{E}_1 = \hat{E}_2 \wedge \hat{F}_1 = \hat{H}_1 = 90^\circ \rightarrow \hat{C}_1 = \hat{A}_1$ ①
 $\hat{A}_1 = \hat{C}_1 \wedge \hat{F}_1 = \hat{F}_2 = 90^\circ \rightarrow \hat{B} = \hat{E}_1$ ②

سوال 4

BD: نيسار AE=?

$$\left(\begin{array}{l} HD \parallel BC \\ BD / \end{array} \right) \Rightarrow \hat{D}_1 = \hat{B}_2 = \hat{B}_1 = 60^\circ$$

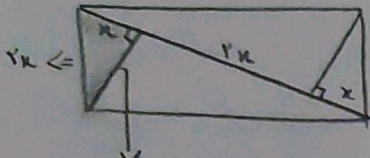


$$\frac{AH}{AB} = \frac{HD}{BC} \rightarrow \frac{y+11}{y+11} = \frac{11}{11}$$

$$11y + 11 = 11y + 11 \Rightarrow y = 11$$

$$y = 11$$

سوال 5



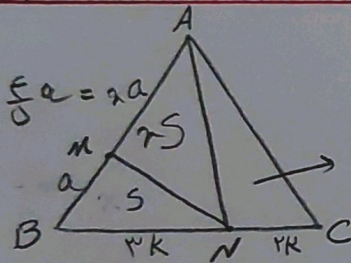
$$\frac{\text{مساحت مثلث}}{\text{مساحت مثلث}} = ?$$

$$(r_k)^2 = x^2 + (\text{مربع})^2 \rightarrow r_k^2 - x^2 = (\text{مربع})^2 \rightarrow r_k^2 = (\text{مربع})^2 \rightarrow \text{مربع} = \sqrt{r_k} x$$

$$\text{طول مثلث} \rightarrow (r_k)^2 = (r_k + x)^2 + (\sqrt{r_k} x)^2 = 9x^2 + 3x^2 = 12x^2 \rightarrow \text{طول مثلث} = 2\sqrt{3} x$$

$$\frac{\text{مساحت مثلث}}{\text{مساحت مثلث}} = \frac{(2\sqrt{3}x)(r_k)}{\frac{1}{2}(x)(\sqrt{r_k}x)} = 1$$

سوال 6



$$r_k BN = r_k NC, S_{ABC} = 3 S_{BMN}$$

$$\frac{BM}{AM} = ?$$

$$\Rightarrow S + nS + \frac{r_k}{r_k}(n+1)S = 3S$$

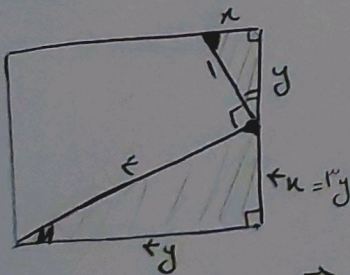
$$\left(\frac{r_k}{r_k}n + \frac{1}{r_k} \right) = 3$$

$$n+1 = \frac{9}{r_k}$$

$$n = \frac{8}{r_k}$$

$$\Rightarrow \frac{BM}{AM} = \frac{a}{\frac{9}{r_k}} = \frac{ar_k}{9}$$

سوال 7

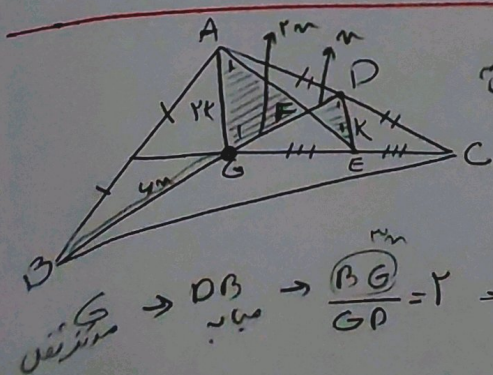


$$\text{دوربج دارم: } r_k y = r_k x + y \rightarrow r_k y = r_k x$$

$$\text{دو مثلث قائم الزاویه: } r_k^2 = (r_k y)^2 + (r_k x)^2 \rightarrow 14 = 14y^2 + 9y^2 \rightarrow 14 = 23y^2 \rightarrow y^2 = \frac{14}{23} \rightarrow y = \frac{r_k}{\sqrt{23}}$$

$$\Rightarrow \text{طول مثلث} = r_k y = r_k \left(\frac{r_k}{\sqrt{23}} \right) = \frac{14}{\sqrt{23}} \Rightarrow S = \frac{14 \times 14}{23}$$

سوال 8



$$G: \text{مرکز ثقل} \quad GE = EC$$

$$\frac{BD}{FD} = ? \rightarrow \frac{9m}{2} = 9$$

$$\frac{DE}{GA} = \frac{CE}{CG} = \frac{1}{2} \Rightarrow GFA \sim DFE \rightarrow \frac{DE}{GF} = \frac{1}{2}$$

$$\left(\begin{array}{l} DE \parallel GA \\ DG / \\ EA / \end{array} \right) \rightarrow \hat{A}_1 = \hat{E}_1, \hat{G}_1 = \hat{D}_1$$

$$\text{مرکز ثقل} \rightarrow DB \rightarrow \frac{BG}{GD} = 2 \Rightarrow GD = 4m$$