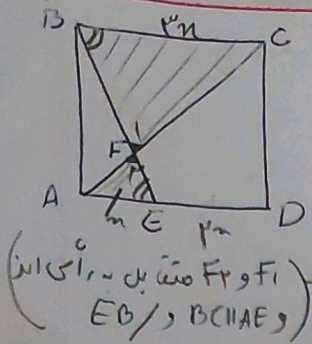


سوال ۱



$$ED = 2AE$$

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

$$BC = 3\sqrt{2}n \rightarrow AC = 3\sqrt{2}n \text{ و } BE = \sqrt{10}n$$

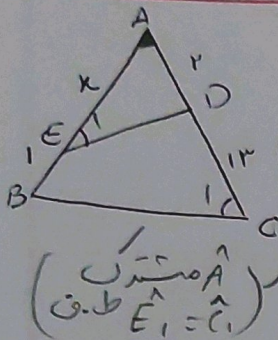
$$\triangle CBF \sim \triangle AFE \rightarrow \frac{CF}{FA} = \frac{BF}{FE} = \frac{BC}{AE} = 3$$

$$\Rightarrow \frac{EF}{AF} = \frac{\frac{\sqrt{10}n}{3}}{\frac{\sqrt{10}n}{3} \times 3} = \frac{\sqrt{10}n}{3\sqrt{10}n} = \frac{1}{3}$$

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

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

سوال ۲



$$\angle AED = \angle ACB$$

$$x = ?$$

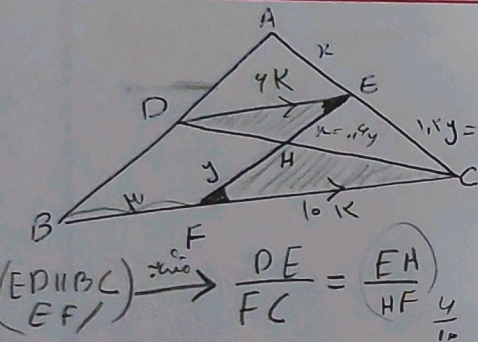
$$\triangle ADE \sim \triangle ABC \rightarrow \frac{AD}{AB} = \frac{AE}{AC}$$

$$\downarrow$$

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

$$\text{غیر صحیح} \rightarrow -5 \checkmark$$

سوال ۳



$$DE \parallel BC$$

$$3y = 5x \rightarrow y = \frac{5}{3}x$$

$$BF = 3$$

$$BC = ?$$

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

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

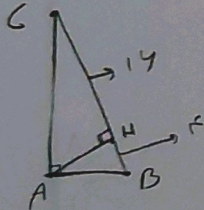
H = نقطه تلاقی ارتفاع‌ها و مرکز دایره

۲. طول وتر

۴. کمترین فاصله H از رأس‌های

? طول اضلاع قائمه

سوال ۴

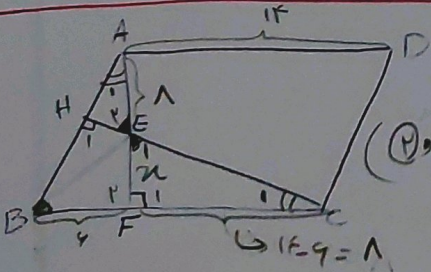


$$(AB)^2 = \frac{BH}{H} \cdot \frac{BC}{20} \Rightarrow AB = 4\sqrt{5}$$

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

$$\Rightarrow \text{نسبت} = \frac{AC}{AB} = 2$$

سوال ۵



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

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

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

$$\text{غیر صحیح} \rightarrow -8 \checkmark$$

$$\Rightarrow AF = 8 + 4 = 12$$

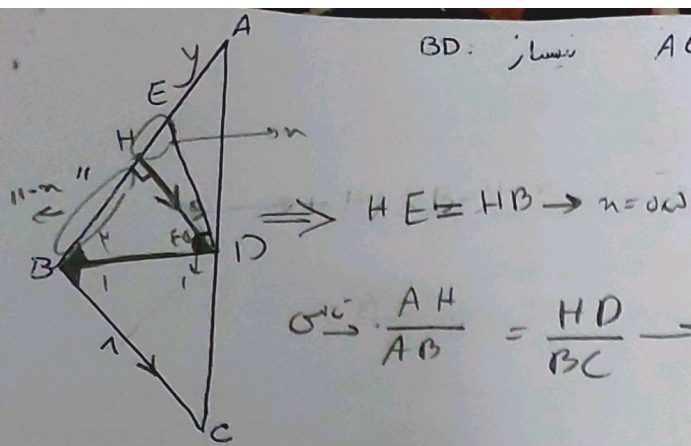
$$\hat{E}_1 = \hat{E}_2 \wedge \hat{F}_1 = \hat{H}_1 = 90^\circ \rightarrow \hat{C}_1 = \hat{A}_1 \quad (1)$$

$$\hat{A}_1 = \hat{C}_1 \wedge \hat{F}_1 = \hat{F}_2 = 90^\circ \rightarrow \hat{B} = \hat{E}_1 \quad (2)$$

سوال 4

BD: نيسار AE=?

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

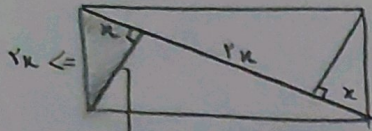


$$\frac{AH}{AB} = \frac{HD}{BC} \rightarrow \frac{y+11}{y+11} = \frac{11}{11}$$

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

$$y = 11$$

سوال 7



$$\frac{\text{مساحت مستطیل}}{\text{مساحت مثلث قائم الزاویه}} = ?$$

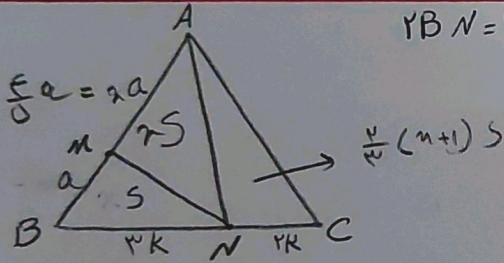
$$(r_k)^2 = x^2 + (\text{منبع})^2 \rightarrow r_k^2 - x^2 = (\text{منبع})^2 \rightarrow r_k^2 = (\text{منبع})^2 \rightarrow \text{منبع} = \sqrt{r_k^2 - x^2}$$

$$\text{طول مستطیل} \rightarrow \text{طول مستطیل} = (r_k + x)^2 + (\sqrt{r_k^2 - x^2})^2 = 4r_k^2 + r_k^2 - x^2 = 5r_k^2 - x^2 \rightarrow \text{طول مستطیل} = 2\sqrt{r_k^2 - x^2}$$

$$\frac{\text{مساحت مستطیل}}{\text{مساحت مثلث قائم الزاویه}} = \frac{(2\sqrt{r_k^2 - x^2})(r_k)}{\frac{1}{2}(x)(\sqrt{r_k^2 - x^2})} = 4$$

سوال 8

$$2BN = 3NC, S_{ABC} = 3S_{BMN}, \frac{BM}{AM} = ?$$



$$\Rightarrow S + nS + \frac{1}{5}(n+1)S = 3S$$

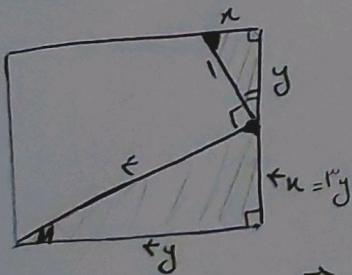
$$\left(\frac{1}{5}n + \frac{1}{5} \right) = 2 \Rightarrow n = 9$$

$$\Rightarrow \frac{BM}{AM} = \frac{a}{\frac{1}{5}a} = 5$$

$$n+1 = \frac{9}{5}$$

$$n = \frac{4}{5}$$

سوال 9



$$\text{دوربج دارم: } r_y = r_k + y \rightarrow r_y^2 = r_k^2$$

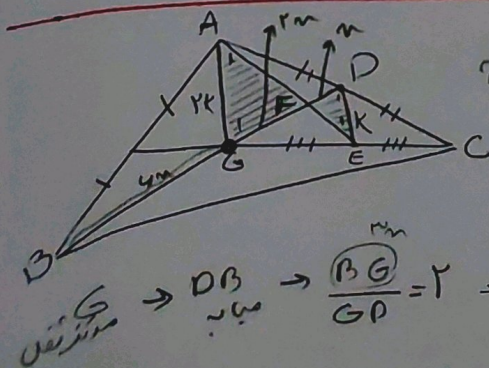
$$\text{دو مثلث قائم الزاویه دارم: } r^2 = (r_y)^2 + (r_k)^2 \rightarrow 14 = 14y^2 + 9y^2 \rightarrow 14 = 23y^2 \rightarrow y^2 = \frac{14}{23} \rightarrow y = \frac{r}{\sqrt{23}}$$

$$y^2 = \frac{14}{23} \rightarrow y = \frac{r}{\sqrt{23}}$$

$$\Rightarrow \text{طول منبع مربع} = r_y = r \left(\frac{r}{\sqrt{23}} \right) = \frac{14}{\sqrt{23}} \Rightarrow S = \frac{196}{23}$$

سوال 10

$$G: \text{مرکز ثقل} \quad GE = EC \quad \frac{BD}{FD} = ? \rightarrow \frac{9n}{2} = 9$$



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

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

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