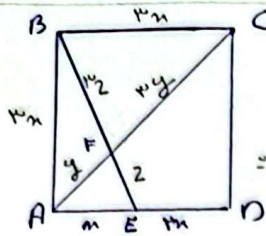


٢٠

سوال (١)



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

در مثل قائم الزاویه  $\triangle ADC$ :  $\Rightarrow \sqrt{9n^2 + 9n^2} = 3\sqrt{2}n = AC$

در مثل قائم الزاویه  $\triangle ABE$ :  $\Rightarrow \sqrt{9n^2 + n^2} = \sqrt{10}n = BE$

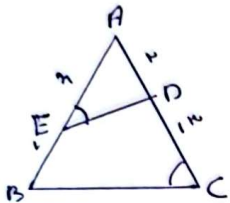
مستقيم  $\triangle AFE \sim \triangle CFB \rightarrow \frac{AF}{EF} = \frac{FE}{FB} = \frac{AE}{BC} = \frac{n}{3n} = \frac{1}{3}$

$AF = y \rightarrow y \cdot 3y = 3\sqrt{2}n \rightarrow y = \frac{3\sqrt{2}}{3}n$

$EF = 2 \rightarrow 2 \cdot 3y = \sqrt{10}n \rightarrow 2 = \frac{\sqrt{10}}{3}n$

$\Rightarrow \frac{EF}{AF} = \frac{\frac{\sqrt{10}}{3}n}{\frac{3\sqrt{2}}{3}n} = \frac{\sqrt{5}}{3}$

٥



$n = ?$

$\left. \begin{matrix} \angle AED = \angle ACB \\ \hat{A} = \hat{A} \end{matrix} \right\} \rightarrow \triangle AED \sim \triangle ACB \rightarrow \frac{AE}{AC} = \frac{ED}{BC} = \frac{AD}{AB} \rightarrow \frac{n}{10} = \frac{y}{n+1} \rightarrow n^2 + n - 30 = 0$

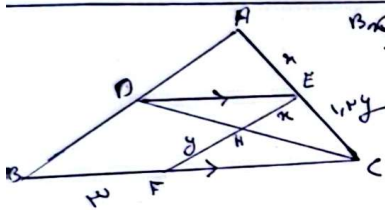
$n^2 + n - 30 = 0$

$(n+6)(n-5) = 0$

$n = -6$  و  $n = 5$

$n = 5$

سوال (٢)



$BC = ?$   $DE \parallel BC$   $\rightarrow$  در مثل  $\triangle ABC \rightarrow \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{n}{n+1+y} = \frac{DE}{FC+y}$

$3y = 10n$   
 $y = \frac{10}{3}n$

$\frac{n}{n+1+\frac{10}{3}n} = \frac{DE}{y+FC} \rightarrow \frac{n}{n+\frac{13}{3}n} = \frac{DE}{\frac{10}{3}n+FC} \Rightarrow 3DE = 3+FC$  (١)

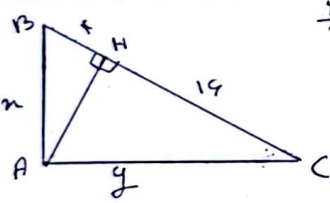
$DE \parallel FC \Rightarrow \frac{DE}{FC} = \frac{EH}{HF} \rightarrow \frac{DE}{FC} = \frac{n}{y} = \frac{n}{\frac{10}{3}n} \rightarrow 3DE = FC$  (٢)

(١), (٢)  $\rightarrow 3+FC = FC \Rightarrow 3+FC = \frac{9}{3}FC \rightarrow 3+FC = 3FC \rightarrow FC = \frac{3}{2} = 1.5$

$BC = BF + FC = 3 + 1.5 = 4.5$

سوال (٣)

٥



$\frac{y}{n} = ?$

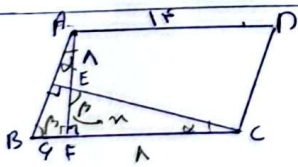
$n^2 = BF + FC \rightarrow n = \sqrt{4+14} = \sqrt{18}$

$y^2 = CH + FC \rightarrow y = \sqrt{14+14} = \sqrt{28}$

$\frac{y}{n} = \frac{\sqrt{28}}{\sqrt{18}} = \sqrt{\frac{28}{18}} = \sqrt{\frac{14}{9}} = \frac{\sqrt{14}}{3}$

سوال (٤)

٥



$AF = ?$

$\left. \begin{matrix} \hat{F} = \hat{F} = 90^\circ \\ \angle ABF = \angle FEC \end{matrix} \right\} \rightarrow \triangle ABF \sim \triangle FEC \rightarrow \frac{AF}{CF} = \frac{BF}{EF} \rightarrow \frac{n+14}{14} = \frac{9}{n}$

$n^2 + 14n - 126 = 0$

$(n+14)(n-9) = 0$

$n = -14$  و  $n = 9$

$n = 9$

$AF = n + AE = 9 + 14 = 23$

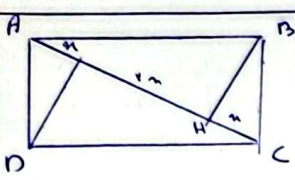
سوال (٥)

٥

HE = ?  
 اگر متساوی الساقین BDE را به ۲ زاویه  $\alpha$  و  $\beta$  تبدیل کردیم با هم  $\alpha + \beta = 90^\circ$  میسر می آید  
 پس  $\alpha = 90^\circ - \beta$  و  $\beta = 90^\circ - \alpha$  میسر می آید  
 در روابط مثلث قائم‌الزاویه  $\alpha + \beta = 90^\circ$  میسر می آید  
 پس  $\alpha = 90^\circ - \beta$  و  $\beta = 90^\circ - \alpha$  میسر می آید  
 در روابط مثلث قائم‌الزاویه  $\alpha + \beta = 90^\circ$  میسر می آید  
 پس  $\alpha = 90^\circ - \beta$  و  $\beta = 90^\circ - \alpha$  میسر می آید

$\frac{AO}{AB} = \frac{OD}{BC} \rightarrow \frac{y + \omega + \alpha}{y + 11} = \frac{11}{\alpha} \rightarrow 14y + \alpha\alpha = 11y + 121$   
 $\omega y = 33 \rightarrow y = \frac{33}{\omega} = 4.9$

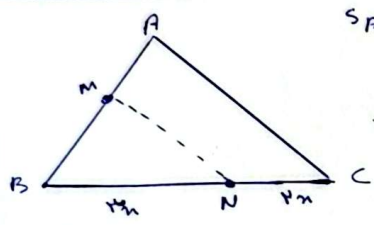
5



$S_{BHC} = \frac{n \times BH}{2}$   
 $S_{ABC} = \frac{BH \times f \times n}{2}$   
 $S_{مستطیل} = S_{ABH} + S_{BHC} = BH \times f \times n$   
 $\frac{S_{مستطیل}}{S_{BHC}} = \frac{BH \times f \times n}{\frac{n \times BH}{2}} = 2$

سوال (5) <

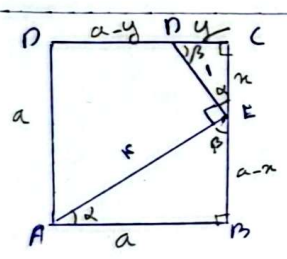
5



$S_{ABC} = 4 S_{BMN} \rightarrow \frac{BM}{AM} = ?$   
 $\frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{2} \times AB \times BC \times \sin B}{\frac{1}{2} \times BM \times BN \times \sin B} = 4 \rightarrow \frac{AB \times \omega \times \alpha}{BM \times n \times \alpha} = 4 \rightarrow \frac{AB}{BM} = \frac{4}{\omega}$   
 $\frac{AM}{BM} = \frac{f}{\omega} \rightarrow \frac{BM}{AM} = \frac{\omega}{f} = 1.25$

سوال (6) <

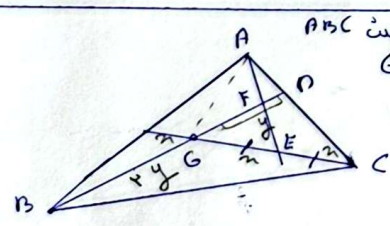
5



$\triangle DEC \sim \triangle EAB \rightarrow \frac{DC}{EB} = \frac{EC}{AB} = \frac{DE}{EA} = \frac{y}{a-n} = \frac{n}{a} = \frac{1}{f}$   
 $a = fn$   
 $a - n = fy \rightarrow fn - n = fy \rightarrow n(n - f) = fy$   
 $14 = 2 + (a - n)^2 \rightarrow 14 = 2 + (a - n)^2 \rightarrow 14 = 2 + a^2 - 2an + n^2$   
 $12 = a^2 - 2an + n^2$   
 $n^2 = \frac{14}{\omega} \rightarrow n = \frac{f}{\omega}$   
 $a = fn \rightarrow a = \frac{14}{\omega}$   
 $a^2 = \frac{14 \times 14}{\omega \times \omega} = \frac{196}{\omega^2} = 10.24$

سوال (7) <

5



$\frac{BD}{FD} = ?$   
 $G$  محل برخورد میان‌های مثلث ABC است و میان‌ها یک‌دیگر را به نسبت ۲:۱ تقسیم می‌کنند  
 $G$  محل برخورد میان‌های مثلث ABC است و میان‌ها یک‌دیگر را به نسبت ۲:۱ تقسیم می‌کنند  
 $GF = \frac{2}{3}y$   
 $FD = \frac{1}{3}y$   
 $\frac{BD}{FD} = \frac{2y}{\frac{1}{3}y} = 6$

سوال (8) <

5