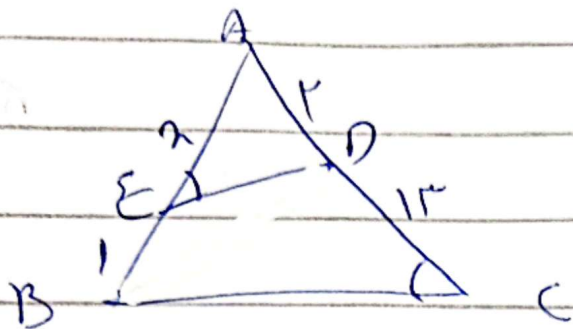


$$\hat{AED} = \hat{ACB}$$

(P)



$$\begin{matrix} \hat{A} = \hat{A} \\ \hat{E} = \hat{C} \end{matrix} \left\{ \begin{matrix} \text{AA} \\ \text{AA} \end{matrix} \right\} \rightarrow \hat{AED} \sim \hat{ACB}$$

(P)

$$\frac{AD}{AB} = \frac{AE}{AC} = \frac{ED}{BC}$$

$$\frac{y}{x+1} = \frac{x}{18} = \frac{ED}{BC}$$

$$x(x+1) = 18$$

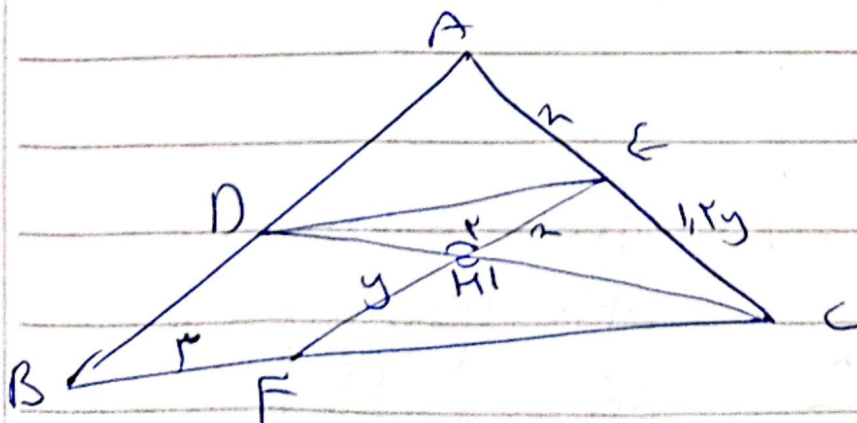
$$x^2 + x - 18 = 0 \rightarrow (x+9)(x-2) = 0$$

$$x = 9 \text{ or } x = -9$$

$$\boxed{x = 2}$$

$$DE \parallel BC, \quad y = 2x, \quad BF = x, \quad BC = 18$$

(P)



$$\begin{matrix} \hat{A} = \hat{A} \\ \hat{E} = \hat{F} \\ \hat{D} = \hat{C} \end{matrix}$$

$$\left\{ \begin{matrix} \text{AA} \\ \text{AA} \\ \text{AA} \end{matrix} \right\} \rightarrow \hat{ADE} \sim \hat{HFE}$$

(P)

$$\frac{FM}{EM} = \frac{CH}{PH} = \frac{FC}{DE}$$

$$\frac{y}{n} = \frac{CH}{DH} = \frac{FE}{DE} = \frac{\omega}{r}$$

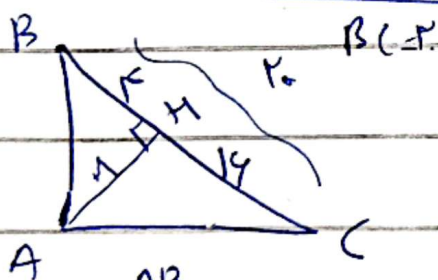
$$DE \parallel BC \rightarrow \frac{n}{r+n} = \frac{DE - r_n}{BC - r}$$

$$\downarrow \frac{1}{r} = \frac{r_n}{r+n}$$

$$rn = rn + r$$

$$rn = r \rightarrow n = \frac{r}{r}$$

$$BC = FC + BF = r + \omega \times \frac{r}{r} = r + \frac{10}{2} = \frac{2\sqrt{5}}{r}$$



$$AH^2 = BH \times CH$$

$$AH^2 = 4 \times 5 \rightarrow AH = 1$$

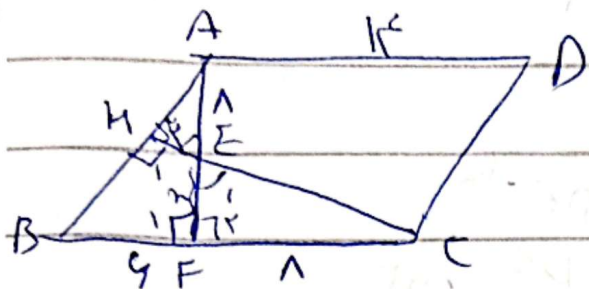
$$AB^2 = 1^2 + 5^2 \rightarrow AB = \sqrt{26}$$

$$AC^2 = 1^2 + 4^2 \rightarrow AC = \sqrt{17}$$

$$\frac{AB}{AC} = \frac{\sqrt{26}}{\sqrt{17}} = \frac{r\sqrt{26}}{r\sqrt{17}} = \frac{1}{r}$$



$AD = 12$, $BF = 4$, $AE = 1$ $AF = ?$ (3)



(4)

$$\begin{cases} \hat{E}_1 = \hat{E}_2 \\ \hat{F}_1 = \hat{F}_2 = 90^\circ \end{cases} \rightarrow \triangle ABF \sim \triangle CEF$$

$$\frac{AF}{CF} = \frac{BF}{EF} = \frac{AB}{CE}$$

$$\frac{1+n}{1} = \frac{4}{EF}$$

$$n(1+n) = 4$$

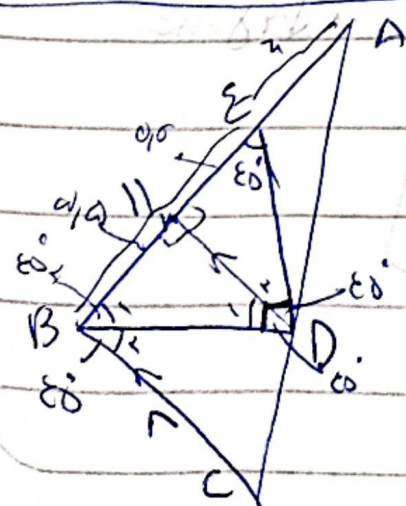
$$n^2 + 1n - 4 = 0$$

$$(n+4)(n-1) = 0$$

$$n = -4 \text{ or } 1$$

$$n = 1$$

$$AF = 1 + n = 1 + 1 = 2$$



خط BD

$AE = ?$

(4)

$$\hat{B}_1 = \hat{B}_2 = \hat{D}_1 \Rightarrow B_1 = D_1 = 90^\circ$$

$$B_1 = E$$

$$D_1 = B$$

خط BD

$$\rightarrow BDH \sim DHE$$

(4)

$$BH = CH = \frac{11}{2} = 5.5$$

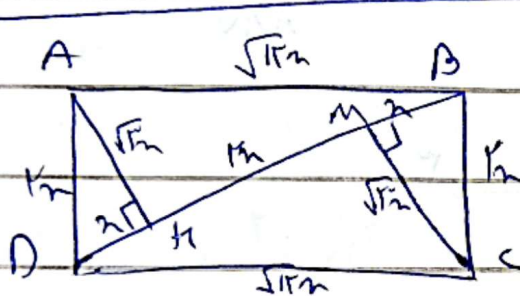
$$BC \parallel DM$$

$$\frac{5.5 + n}{11 + n} = \frac{DM}{CB} = \frac{5.5}{11}$$

$$\frac{5.5 + n}{5.5} = \frac{5.5}{5.5} = 1$$

$$5.5 + n = 5.5$$

$$n = 0 \Rightarrow AE = 5.5$$



$$\frac{S_{ABCD}}{S_{ADM}} = ?$$



$$AM^2 = DM \times BM$$

$$AM^2 = n \times kn = kn^2 \rightarrow AM = \sqrt{12}n$$

$$CM^2 = MB \times MD = n \times kn = kn^2 \rightarrow CM = \sqrt{12}n$$

$$AD^2 = BC^2 = (\sqrt{12}n)^2 + n^2 = 12n^2 + n^2 = 13n^2$$

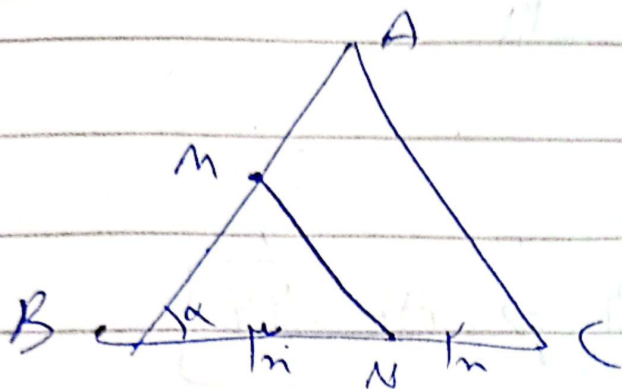
$$AD = BC = kn$$

$$AD^2 + AB^2 = BC^2$$

$$AB^2 = 13n^2 - kn^2 = 12n^2 \rightarrow AB = \sqrt{12}n$$

$$\frac{S_{ABCD}}{S_{ADM}} = \frac{\sqrt{12}n \times kn}{\frac{\sqrt{12}n \times n}{2}} = \frac{k\sqrt{12} \times 2}{\sqrt{12}} = \frac{k \times 2\sqrt{12} \times 2}{\sqrt{12}} = 4$$





$$r_{NC} = r_{BN}$$

$$\frac{S_{ABC}}{S_{BMN}} = r$$

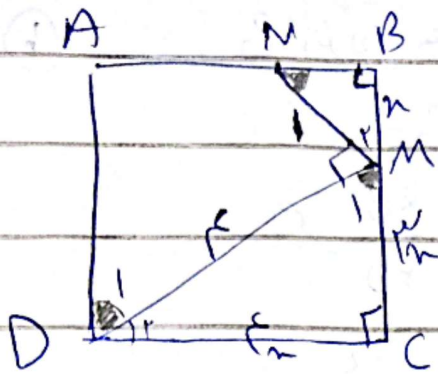
$$\frac{BM}{AM} = ?$$

$$\frac{S_{ABC}}{S_{BMN}} = \frac{AB \times BC \times \sin \alpha}{BM \times BN \times \sin \alpha} = r$$

$$\frac{S_{ABC}}{S_{BMN}} = \frac{AB \times \cancel{BC}}{BM \times \cancel{BN}}$$

$$\frac{r}{1} = \frac{AB}{BM}$$

$$\frac{BM}{AM} = \frac{BM}{AB - BM} = \boxed{\frac{r}{r+1}}$$



مسألة ٩

$$\begin{cases} \hat{m}_1 + \hat{n} = 9 \\ \hat{m}_1 + \hat{m}_2 = 9 \end{cases} \Rightarrow \hat{n} = \hat{m}_1$$

$$\begin{cases} \hat{m}_1 = \hat{D} \\ \hat{n} = \hat{m}_1 \end{cases} \Rightarrow \triangle NBM \sim \triangle MCD$$

$$\frac{MC}{NB} = \frac{CD}{MB} = \frac{MD}{MN}$$

٥

$$\frac{MC}{NB} = \frac{CD}{MB} = \frac{r}{1}$$

$$MD^2 = MC^2 + CD^2 \Rightarrow 14 = (r)^2 + \frac{(r)^2}{a^2}$$

$$14 = 14r^2 + 9r^2$$

$$14 = 23r^2$$

$$\frac{14}{23} = r^2 \Rightarrow r = \frac{r}{a}$$

$$r_n = r \times \frac{r}{a} = \frac{14}{a}$$

$$S_{\square} = \frac{14}{a} \times \frac{14}{a} = \frac{196}{a^2} = 10,12$$

