

$$\Delta ADC \Rightarrow \sqrt{4r^2 + 4r^2} = r\sqrt{2} = AC$$

$$\Delta ABE \Rightarrow \sqrt{4x^2 + r^2} = \sqrt{1} \cdot r = BE$$

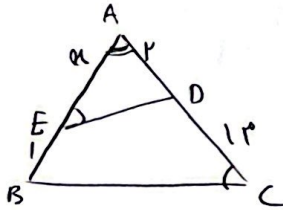
$$\Delta AEF \sim \Delta CFB \Rightarrow \frac{AF}{EF} = \frac{FE}{FB} = \frac{AE}{BC} \rightarrow \frac{x}{r} = \frac{1}{r}$$

$$EF = 2 \rightarrow 2 + r^2 = \sqrt{1} \cdot r \rightarrow 2 = \frac{\sqrt{1}}{2} r$$

$$AF = y \rightarrow y + r^2 = r\sqrt{2} \rightarrow y = \frac{r\sqrt{2}}{2}$$

$$\frac{EF}{AF} = \frac{\frac{\sqrt{1}}{2} r}{\frac{r\sqrt{2}}{2}} = \frac{\sqrt{2}}{r}$$

(1)



$$\Delta AED \sim \Delta ABC \rightarrow \frac{AE}{AC} = \frac{AD}{AB} = \frac{ED}{CB}$$

$$\frac{y}{r} = \frac{x}{r} = \frac{ED}{1}$$

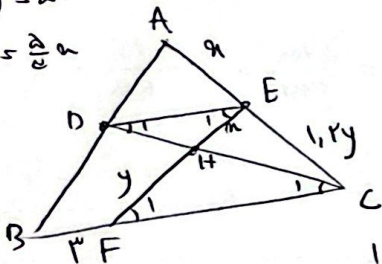
$$x + y = r \rightarrow x + y = r \rightarrow (x+y)(x-y) = r^2 - y^2$$

$$x = y$$

(2)

$$y = 2x$$

$$y = \frac{2}{3}r$$



$$DE \parallel BC \rightarrow \hat{D}_1 = \hat{C}_1, \hat{E}_1 = \hat{F}_1$$

$$\frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{y}{r} = \frac{DE}{1}$$

$$\frac{y}{r} = \frac{DE}{1} \Rightarrow \frac{y}{r} = \frac{DE}{1}$$

$$\frac{1}{r} = \frac{DE}{FC+r} \rightarrow rDE = FC+r$$

$$\frac{DE}{FC} = \frac{EH}{HF} \rightarrow \frac{DE}{FC} = \frac{r}{2} = \frac{y}{1}$$

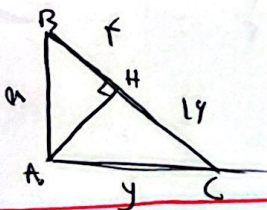
$$\textcircled{1} \Delta DE = rFC \rightarrow -rDE = -r \rightarrow DE = r^2$$

$$4DE = rFC + r$$

$$FC = \frac{r}{4} \Delta BC = FC + r \rightarrow \frac{r}{4} \Delta + r$$

$$BC = \frac{r}{4} \Delta$$

(3)



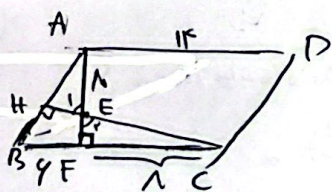
$$r = r(r) \rightarrow x = \sqrt{1}$$

$$y^2 = 1 - r^2 \rightarrow y = \sqrt{1 - r^2}$$

$$\frac{y}{r} = \frac{\sqrt{1-r^2}}{r} = \sqrt{1-\frac{r^2}{r^2}} = \sqrt{1-1} = 0$$

$$\frac{y}{r} = \frac{1}{r} \rightarrow y = 1$$

(4)



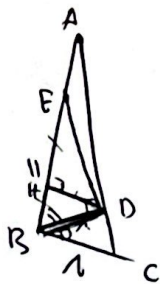
$$\Delta AEF \sim \Delta CEF \rightarrow \Delta AEF \sim \Delta CEF$$

$$\frac{AB}{CE} = \frac{AF}{CF} = \frac{BF}{EF} \rightarrow \frac{r+1}{1} = \frac{y}{r} \rightarrow r^2 + 1 = y$$

$$AF = 2 + AE$$

$$r+1 = 1r$$

$$(r+1)(r-1) \rightarrow r^2 - 1 = 0 \rightarrow r = 1$$



$$HD \parallel BC \rightarrow \hat{HDB} = \hat{DBC}$$

$$B_1 = B_2 = \hat{HDB} \Rightarrow \hat{HBD} \rightarrow \text{مساواة الزوايا}$$

$$\text{مساواة الأضلاع}$$

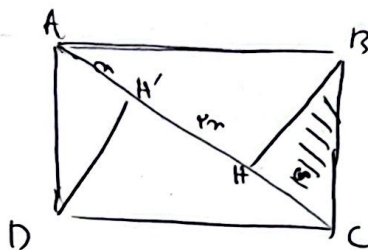
$$D_1 = 45$$

$$\hat{B} = 90^\circ \quad D_1 + D_2 = 90^\circ \rightarrow D_2 = 45$$

$$DH = BH = EH \Rightarrow \frac{11}{y} = 2.5$$

مطلوب : $\frac{AE + 0.10}{11 + AE} = \frac{0.10}{1} \rightarrow 1 \cdot AE + 11 = 0.10 \cdot AE + 0.10$

$$1.9 \cdot AE = 10.9 \rightarrow \boxed{AE = 5.74}$$

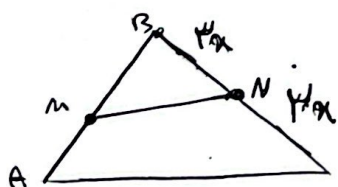


$$S_{BHC}^{\Delta} = \frac{n \times BH}{2}$$

$$S_{ABC}^{\Delta} = \frac{BH \times AC}{2}$$

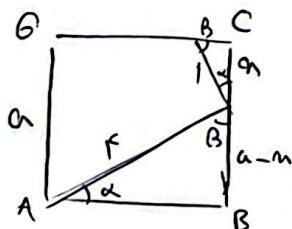
$$S_{\text{المثل}} = S_{ABC}^{\Delta} + S_{ADC}^{\Delta} = BH \times AC$$

$$\frac{S_{\text{المثل}}}{S_{BHC}^{\Delta}} = \frac{BH \times AC}{\frac{n \times BH}{2}} = \frac{12}{n} = 1$$



$$\frac{S_{ABC}^{\Delta}}{S_{BMN}^{\Delta}} = \frac{AB \times AC \times \frac{1}{2} \sin A}{BM \times BN \times \frac{1}{2} \sin B} = \frac{AB}{BM} = 9 \rightarrow \frac{AB}{BM} = 9$$

$$\frac{AB - BM}{BM} = \frac{8}{1} \Rightarrow \frac{AM}{BM} = \frac{8}{1} \rightarrow \frac{BM}{AM} = \frac{1}{8} = 1.125$$



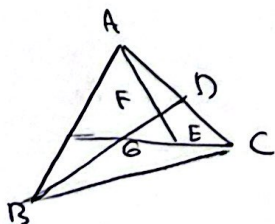
$$\triangle DEC \sim \triangle ERA \Rightarrow \frac{DE}{ER} = \frac{EC}{AR} = \frac{DE}{EA}$$

$$\frac{y}{a-n} = \frac{n}{a} = \frac{1}{2} \rightarrow \begin{cases} a = 2n \\ a - n = 2y \end{cases} \rightarrow \begin{cases} n = 2y \\ n - y = y \end{cases} \rightarrow n = 2y$$

$$ABE \Rightarrow 14 = a^2 + (a-n)^2 \Rightarrow 14 = 14n^2 + 9n^2 \quad \frac{n}{y} = \frac{1}{2}$$

$$25 = \frac{14}{1.25} \rightarrow n = \frac{1}{2} \rightarrow a = 2n \quad a = \frac{14}{2}$$

$$S_{\text{مربع}} = a^2 = \frac{14 \times 14}{1.25} = \frac{196}{1.25} = 156.8$$



Q على الحدود من هـ إلى أ - سبب - أن هـ تقع على AC

$$\triangle AGC \Rightarrow AE, GE \rightarrow \text{مربع} \rightarrow \text{مربع F}$$

$$GF = \frac{1}{2}y \quad FD = \frac{1}{2}y$$

$$\frac{BD}{FD} = \frac{\frac{1}{2}y}{\frac{1}{2}y} = 1$$