

$$\triangle ADC \Rightarrow \sqrt{4r^2 + r^2} = r\sqrt{5} = AC$$

$$\triangle ABE \Rightarrow \sqrt{4x^2 + r^2} = \sqrt{5} \cdot x = BE$$

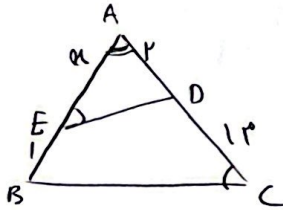
$$\triangle AEF \sim \triangle CFB \Rightarrow \frac{AF}{EF} = \frac{FE}{FB} = \frac{AE}{BC} \rightarrow \frac{y}{z} = \frac{1}{r} \quad (1)$$

$$EF = z \rightarrow z + rz = \sqrt{5} \cdot x \rightarrow z = \frac{\sqrt{5}}{2} x$$

$$AF = y \rightarrow y + ry = r\sqrt{5} \rightarrow y = \frac{r\sqrt{5}}{2}$$

$$\frac{EF}{AF} = \frac{\frac{\sqrt{5}}{2} x}{\frac{r\sqrt{5}}{2}} = \frac{\sqrt{5}}{r}$$

(1)



$$\triangle AED \sim \triangle ADB \rightarrow \frac{AE}{AC} = \frac{AD}{AB} = \frac{ED}{DB} \quad (2)$$

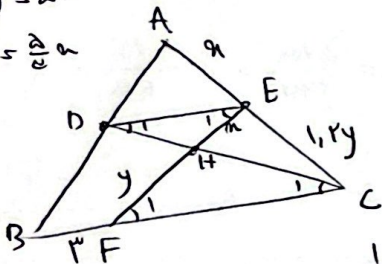
$$\frac{y}{r} = \frac{x}{r} = \frac{ED}{DB}$$

$$x + y = r \rightarrow x + y = r \rightarrow (x+y)(x-y) = r^2 - y^2 \rightarrow \boxed{x = \frac{r^2 - y^2}{r}}$$

(2)

$$ry = 2x$$

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



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

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

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

$$\frac{1}{r} = \frac{DE}{FC+r} \rightarrow rDE = FC+r \quad (3)$$

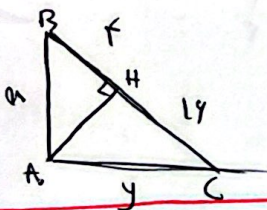
$$\frac{DE}{FC} = \frac{EH}{HF} \rightarrow \frac{DE}{FC} = \frac{y}{r} \rightarrow \boxed{\frac{DE}{FC} = \frac{y}{r}}$$

$$\textcircled{1} \quad 2DE = rFC \rightarrow -rDE = -r \rightarrow DE = r/2$$

$$4DE = rFC + r$$

$$FC = \frac{r}{2} \rightarrow BC = FC + r \rightarrow \frac{r}{2} + r = \frac{3r}{2} \rightarrow \boxed{BC = \frac{3r}{2}}$$

(3)



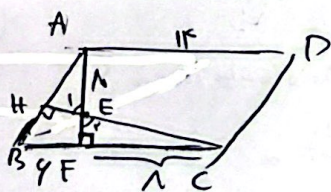
$$r = r(r) \rightarrow x = \sqrt{r}$$

$$y = r(r) \rightarrow y = \sqrt{r}$$

$$\frac{y}{x} = \frac{\sqrt{r}}{\sqrt{r}} = \sqrt{r} = \boxed{r}$$

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

(4)



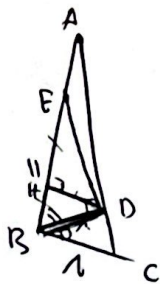
$$\triangle ABE \sim \triangle FCE \quad \hat{A} = \hat{F} = 90^\circ \rightarrow \triangle ABE \sim \triangle FCE$$

$$\frac{AB}{CE} = \frac{AE}{CF} = \frac{BE}{EF} \rightarrow \frac{r}{r} = \frac{x}{r-y} = \frac{r}{r-y}$$

$$(r+y)(r-x) \rightarrow \frac{r}{r} = \frac{1}{r} \rightarrow \boxed{r = 1}$$

$$\frac{AF}{r} = \frac{AE}{r} \rightarrow \boxed{AF = AE}$$

(5)



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

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

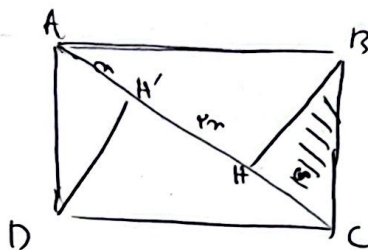
$$D_1 = 45$$

$$\hat{D} = 90 \quad D_1 + D_2 = 90 \rightarrow D_2 = 45$$

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

ملاحظة: $\frac{AE + 0.8}{11 + AE} = \frac{0.8}{1} \rightarrow 1AE + 44 = 0.8AE + 9.8$

$$0.2AE = 14.8 \rightarrow \boxed{AE = 74}$$

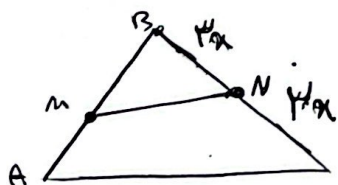


$$S_{BHC} = \frac{n \times BH}{2}$$

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

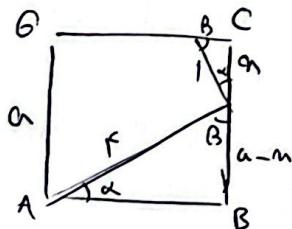
$$S_{\text{مربع}} = S_{ABC} + S_{ADC} = BH \times AC$$

$$\frac{S_{\text{مربع}}}{S_{BHC}} = \frac{BH \times AC}{\frac{n \times BH}{2}} = \frac{AC}{n} = 1.2 \Rightarrow \boxed{1}$$



$$\frac{S_{ABC}}{S_{BMN}} = \frac{AB \times AC \times \frac{1}{2} \sin A}{BM \times BN \times \frac{1}{2} \sin A} = \frac{AB \times AC}{BM \times BN} = 4 \rightarrow \frac{AB}{BM} = \frac{AC}{BN} = 2$$

$$\frac{AB - BM}{BM} = \frac{AC - BN}{BN} = \frac{1}{2} \Rightarrow \frac{AM}{BM} = \frac{CN}{BN} = \frac{1}{2} \rightarrow \frac{BM}{AM} = \frac{BN}{CN} = 2 \Rightarrow \boxed{1.2}$$



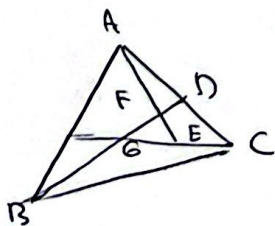
$$\triangle DEC \sim \triangle EBA \Rightarrow \frac{DE}{EB} = \frac{EC}{AB} = \frac{DE}{EA}$$

$$\frac{y}{a-n} = \frac{n}{a} = \frac{1}{2} \rightarrow \begin{cases} a = 2n \\ a - n = 2y \end{cases} \rightarrow \begin{cases} n = 2y \\ a - 2y = 2y \end{cases} \rightarrow \begin{cases} n = 2y \\ a = 4y \end{cases}$$

$$ABE \Rightarrow 14 = a^2 + (a-n)^2 \Rightarrow 14 = 14n^2 + 9n^2$$

$$25 = \frac{14}{12} \rightarrow n = \frac{5}{2} \rightarrow a = 10 \quad a = \frac{14}{2}$$

$$S_{\text{مربع}} = a^2 = \frac{14 \times 14}{12} = \frac{196}{12} = \boxed{1.12}$$



Q على الحدود من هـ الى ا ب سبب ان ا ب قطع هـ د

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

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

$$\frac{BD}{FD} = \frac{\frac{1}{2}y}{\frac{1}{2}y} = \boxed{4}$$