

T=21

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Date

Subject

$$AE = 9 \quad ED = 2m \quad BC = 3m$$

$$\triangle BCF \sim \triangle ECF \Rightarrow BF = 3y, FE = y / AF = 2, FC = 3/2$$

$$\begin{cases} AC^2 = AD^2 + CD^2 \Rightarrow (4Z)^2 = 9m^2 + 9m^2 = 18m^2 \\ BE^2 = AB^2 + AE^2 \Rightarrow (4y)^2 = 9m^2 + m^2 = 10m^2 \end{cases}$$

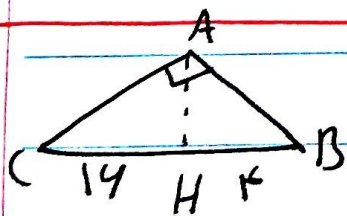
$$\Rightarrow \frac{y}{Z} = \sqrt{\frac{10}{18}} = \frac{\sqrt{5}}{3}$$

$$\triangle AED \sim \triangle ABC \quad \frac{r}{n+1} = \frac{n}{10} \Rightarrow n^2 + m = 10 \quad \begin{cases} n=0 \\ n=-9 \end{cases} \quad (1)$$

$$y = \frac{5}{3}n \Rightarrow \frac{n}{1/y} = \frac{n}{3m} = \frac{1}{r} \Rightarrow \frac{DE}{BC} = \frac{1}{3} \quad (2)$$

$$\triangle DEH \sim \triangle FHC \Rightarrow ED = 3/2 \Rightarrow FC = 0.2$$

$$\frac{3/2}{3+0.2} = \frac{1}{3} \Rightarrow Z = \frac{3}{4} \Rightarrow BC = \frac{10}{4} + 3 = \frac{17}{2}$$



$$AC^2 = CH \times CB = 14 \times 20 \Rightarrow AC = 14\sqrt{2} \quad (3)$$

$$AB^2 = BH \times CB = 4 \times 20 \Rightarrow AB = 10\sqrt{2}$$

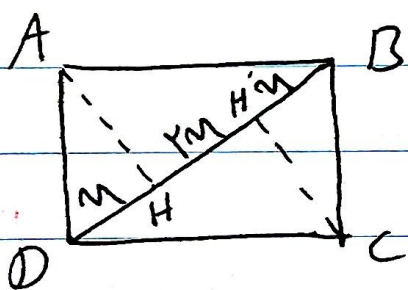
$$\frac{14\sqrt{2}}{10\sqrt{2}} = 2 \frac{1}{5}$$

$$AD=12, BF=4 \Rightarrow FC=1$$

(Q)

$$EF=2 \quad \triangle ABF \sim \triangle EFC \Rightarrow \frac{FC}{AF} = \frac{EF}{BF}$$

$$\Rightarrow \frac{1}{1+2} = \frac{2}{4} \Rightarrow 2=1 \Rightarrow AF=1+1=2$$



$$AH^2 = DH \times HB = 2m^2$$

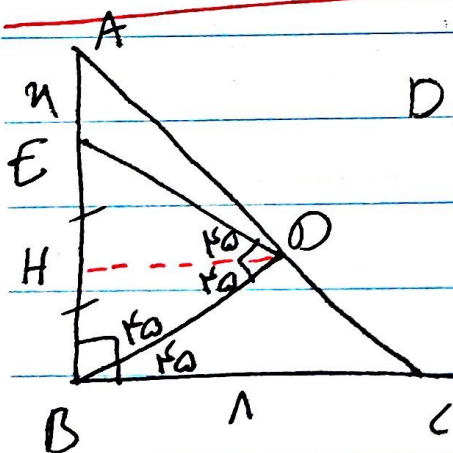
(Q)

$$S_{ADH} = \frac{1}{2} DH \times AH$$

$$AD^2 = DH \times BD = 12m^2$$

$$AB^2 = BH \times BD = 12m^2$$

$$\frac{S_{ABCD}}{S_{ADH}} = \frac{12m \times \sqrt{12}m}{\frac{1}{2} \times \sqrt{12}m \times 2m} = 1$$



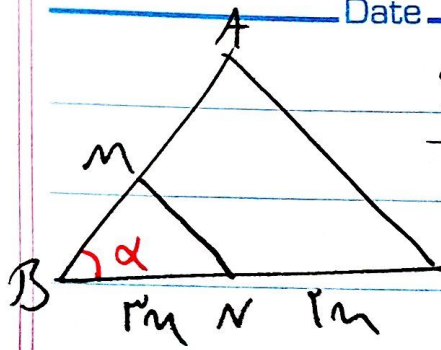
$$DH \parallel BC \Rightarrow H = B = 90^\circ$$

(Q)

$$B_1 = B_2 = 90^\circ \Rightarrow D_1 = D_2 = 90^\circ$$

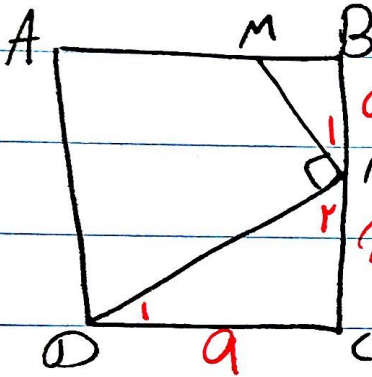
$$DH = BH = HE = 0.4$$

$$\frac{2 + 0.4}{2 + 12} = \frac{0.4}{12} \Rightarrow AE = 2 = 4.4$$



$$\frac{S_{\triangle ABC}}{S_{\triangle BMN}} = \frac{\frac{1}{2} BC \times AB \times \sin \alpha}{\frac{1}{2} BN \times BM \times \sin \alpha} = r$$

$$\frac{\frac{1}{2} \times \frac{1}{r} \times \frac{AB}{BM} = r \Rightarrow \frac{AB - BM}{BM} = \frac{r}{1-r} \Rightarrow \frac{BM}{AM} = \frac{1-r}{r}$$



$$N_1 + N_2 = 90$$

$$D_1 + N_2 = 90 \Rightarrow N_1 = D_1$$

$$\begin{cases} N_1 = D_1 \\ B = C \end{cases} \Rightarrow \triangle MBN \sim \triangle DCN$$

$$\frac{DN}{MN} = \frac{DC}{BN} = \frac{NC}{MB} \Rightarrow DC^2 + CN^2 = DN^2$$

$$a^2 + m^2 = 14 \quad a^2 + \frac{9}{14}a^2 = 14 \Rightarrow a^2 = 5 = \frac{14}{10} = 1.4$$

$$G = \text{مركز ثقل (مركز التوازن)} \quad GD = \frac{1}{3} BD$$

$$FD = \frac{1}{3} GD \Rightarrow FD = \frac{1}{3} \times \frac{1}{3} BD \Rightarrow \frac{BD}{FD} = 9$$