

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

$\triangle BCF \cong \triangle AEF \Rightarrow \frac{BC}{AE} = \frac{FC}{AF} = \frac{BF}{EF} \Rightarrow \frac{2n}{x} = \frac{FC}{AF} = \frac{BF}{EF}$

$\Rightarrow FC = 2AF \Rightarrow AC = AF + FC = 3AF \Rightarrow AF = \frac{AC}{3} = \frac{2\sqrt{5}n}{3}$

$\Rightarrow \triangle AED$: $ED = \sqrt{2n^2 + n^2} = \sqrt{5}n \Rightarrow EF + BF = \sqrt{5}n \Rightarrow EF = \frac{\sqrt{5}}{2}n$

$\Rightarrow \frac{EF}{AF} = \frac{\frac{\sqrt{5}}{2}n}{\frac{2\sqrt{5}n}{3}} = \frac{\sqrt{5}}{4}$

۱

$n = ?$: $\triangle ADE \cong \triangle ABC : \frac{AD}{AB} = \frac{AE}{AC} = \frac{ED}{BC} \Rightarrow \frac{x}{x+y} = \frac{z}{z+w} = \frac{ED}{BC}$

$\Rightarrow x^2 + y^2 = z^2$: $x^2 + y^2 - z^2 = 0 \Rightarrow (x-y)(x+y+z) = 0$

$x = y$: $x = y = z = w$ (طول متساوی)

$n = 0$: $n = 0$ (غیر ممکن)

۲

$BC = ?$: $y = 2x \Rightarrow \frac{x}{y} = \frac{1}{2}$

$\Rightarrow \triangle DEH \cong \triangle FCH : \frac{DE}{FC} = \frac{EH}{FH} = \frac{DH}{CH} : \frac{DE}{FC} = \frac{x}{y} \Rightarrow \frac{DE}{FC} = \frac{1}{2}$

$\triangle ADE \cong \triangle ABC : \frac{AE}{AC} = \frac{DE}{BC} \Rightarrow \frac{z}{z+w} = \frac{DE}{BC} \Rightarrow \frac{z}{z+2z} = \frac{DE}{BC} \Rightarrow \frac{1}{3} = \frac{DE}{BC} \Rightarrow BC = 3DE$

$\Rightarrow FC + x = DE : DE = \frac{1}{3}FC \Rightarrow FC + x = \frac{1}{3}FC \Rightarrow FC(\frac{2}{3}) = x \Rightarrow FC = \frac{3}{2}x = \frac{3}{2} \times 2 = 3$

۳

$BC^2 = HC \times AC \Rightarrow BC^2 = 14 \times 21 \Rightarrow BC = \sqrt{294} = 7\sqrt{6}$

$AB^2 = AH \times AC \Rightarrow AB^2 = 6 \times 21 \Rightarrow AB = \sqrt{126} = 3\sqrt{14}$

$\Rightarrow \text{نسبت اضلاع} : \frac{AB}{BC} = \frac{3\sqrt{14}}{7\sqrt{6}} = \frac{1}{\sqrt{2}}$

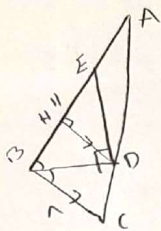
۴

$AF = ?$: $\triangle ABF \cong \triangle FCE \Rightarrow \frac{AB}{EC} = \frac{BF}{FE} = \frac{AF}{FC} \Rightarrow \frac{4}{1} = \frac{BF}{FE} = \frac{AF}{FC}$

$\Rightarrow 4 = \frac{BF}{FE} + \frac{FE}{FE} = \frac{BF+FE}{FE} = \frac{BE}{FE} \Rightarrow 4 = \frac{1+FE}{FE} \Rightarrow 4FE = 1+FE \Rightarrow 3FE = 1 \Rightarrow FE = \frac{1}{3}$

$\Rightarrow AF = AE + EF = 1 + \frac{1}{3} = \frac{4}{3}$

۵

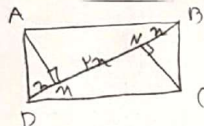


$$AE = 9$$

$$EH = BH = \frac{11}{r} = y$$

$$\frac{y + \frac{11}{r}}{11 + y} = \frac{\frac{11}{r}}{11} \rightarrow y = \frac{11r}{\Delta}$$

9



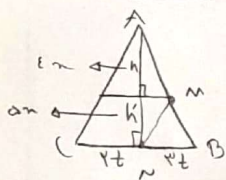
$$\frac{S_{ABCD}}{S_{\triangle BCD}} = ?$$

$$ABD \rightarrow h' = \sqrt{r} \times u \rightarrow h = \sqrt{r} u$$

$$S_{\square} = r \times S_{ABD} = \frac{r \times h \times r}{r} = \sqrt{r} u \times r = r \sqrt{r} u$$

$$S_{\triangle} = \frac{h \times u}{r} = \frac{\sqrt{r} u^2}{r} \quad \frac{S_{\square}}{S_{\triangle}} = \Delta$$

9



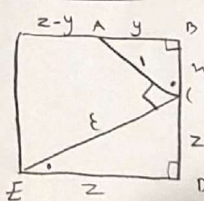
$$\frac{S_{ABC}}{S_{BMN}} = r \rightarrow \frac{\frac{1}{2} \times BC \times (h + h')}{\frac{1}{2} \times BC \times h'} = r = \frac{a(h + h')}{ah + ah'} \rightarrow ah = ah'$$

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

$$\frac{h}{h'} = \frac{AM}{BM} \Rightarrow \frac{BM}{AM} = \frac{h'}{h} = \frac{a}{r} = 1, r_0$$

9

1



$$\triangle ABC \cong \triangle CDE \Rightarrow \frac{AB}{DC} = \frac{AC}{EC} = \frac{BC}{ED} \Rightarrow \frac{y}{z-n} = \frac{1}{\epsilon} = \frac{n}{z} \rightarrow \epsilon n = z$$

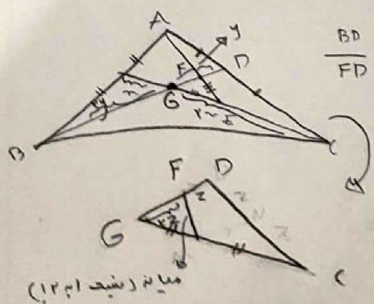
$$\Rightarrow \frac{y}{zn} = \frac{1}{\epsilon} \rightarrow y = \frac{zn}{\epsilon}$$

$$(x \text{ و } y \text{ متغیرات}) \quad x^2 + y^2 = 1 \Rightarrow x^2 + \frac{9}{14} x^2 = 1 \Rightarrow x^2 = \frac{1 \times 14}{25} = \frac{\epsilon}{5} \Rightarrow x = \sqrt{\frac{\epsilon}{5}}, y = \frac{r}{5}$$

$$(x \text{ و } y \text{ متغیرات}) : (z-n)^2 + z^2 = 14 \Rightarrow \sqrt{2}^2 - \frac{1}{5} z + \frac{14}{25} z^2 = 14 \Rightarrow \frac{y}{a-n} = \frac{a}{a} = \frac{1}{F} \rightarrow a = \frac{14}{5}$$

$$S_{\square} - a^2 = \frac{14y}{15}$$

1/5



$$\frac{BD}{FD} = ?$$

! متغیرات: G
در این مسئله ما باید به این نکته توجه کنیم که این مسئله را باید به این روش حل کرد.

$$\Rightarrow y = rz \rightarrow ry = rz \Rightarrow \frac{BD}{FD} = \frac{rz + rz}{z} = \frac{q}{z}$$

5

1