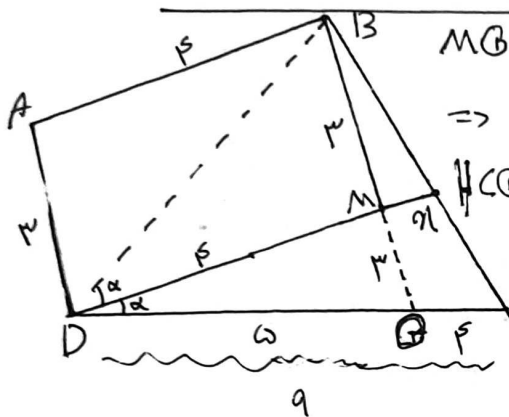


۳. در مثل ABC و DE بر روی BC و AC به ترتیب داریم ارتفاع AD و BE و CF و DE و BC نسبت به مساحت برابر

نسبت متعکس است.

$$\frac{DE}{BC} = \frac{S_{\triangle DEB}}{S_{\triangle BEC}} = \frac{\frac{1}{2} DE \times h}{\frac{1}{2} BC \times h} = \frac{DE}{BC} \Rightarrow \frac{S_{\triangle BEC}}{S_{\triangle DEB}} = \frac{12}{5} = 2.4$$

۱- (۲)



$MB = 3$ و DM را می‌توانستیم به MB برابری است $\Rightarrow MB = 3$

$$\Rightarrow DB = \sqrt{DM^2 + MB^2} = \sqrt{3^2 + 4^2} = 5$$

برای BM و CH داریم $\frac{BM}{MB} = \frac{BH}{HC}$

$$\frac{3}{BM} = \frac{4}{5} \Rightarrow BM = \frac{15}{4}$$

$$\Rightarrow n = 2$$

۲- (۲)

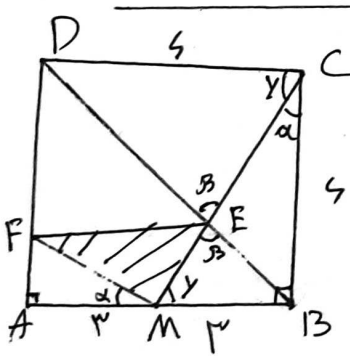
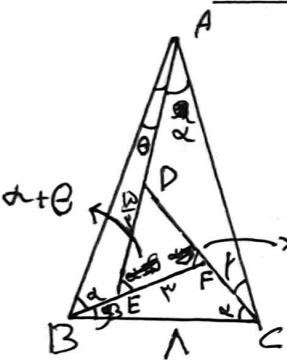
با توجه به زاویه خارجی مثلث DEF و ABC متشابه می‌شوند.

$$\begin{cases} F = \alpha + \beta \\ E = \alpha + \gamma \\ D = \alpha + \delta \end{cases}$$

سزاوار $\Rightarrow \triangle DEF \sim \triangle ABC \Rightarrow \frac{EF}{AB} = \frac{DE}{BC}$

$$\Rightarrow \frac{3}{AB} = \frac{2.5}{1} \Rightarrow AB = 1.2$$

۳- (۲)



$$MC = \sqrt{4^2 + 3^2} = 5$$

$\alpha = \alpha \Rightarrow \triangle AEC \sim \triangle MGC \Rightarrow \frac{AM}{BC} = \frac{FM}{MC}$

$$\Rightarrow \frac{3}{4} = \frac{FM}{5} \Rightarrow FM = \frac{15}{4}$$

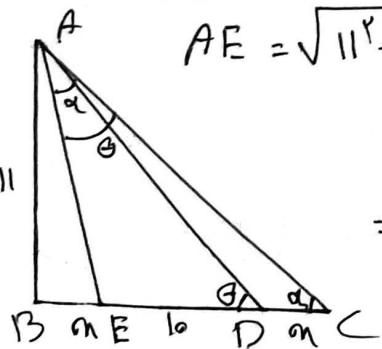
$$\frac{MB}{DC} = \frac{AE}{CE} \Rightarrow \frac{3}{4} = \frac{AE}{5} \Rightarrow AE = \frac{15}{4}$$

$AE = \sqrt{11^2 + n^2} \Rightarrow \alpha = \angle A_1$
 $\theta = \angle D = A$
 E سزاوار $\Rightarrow \triangle ADE \sim \triangle AEC$

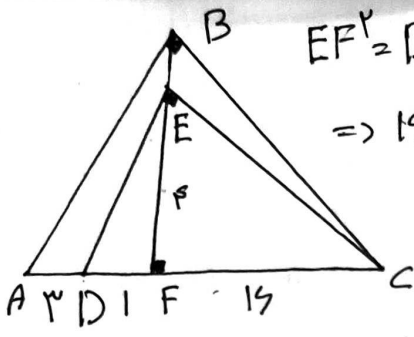
$$\Rightarrow \frac{ED}{AE} = \frac{AE}{EC} \Rightarrow \frac{10}{\sqrt{11^2 + n^2}} = \frac{\sqrt{11^2 + n^2}}{10 + n} \Rightarrow n^2 - 10n + 11 = 0$$

$$\Rightarrow n = 3, 7$$

۵- (۲)



بر طبق رابطه طولی در مثلث قائم الزامی ←

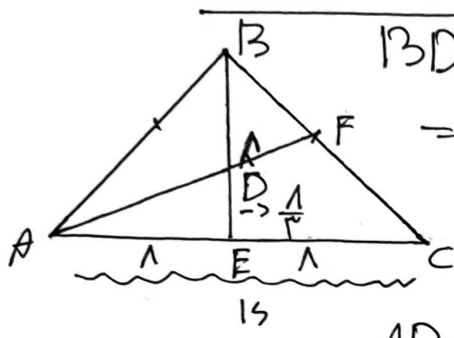


$$EF^2 = DF \times FC$$

$$\Rightarrow 15 = 1 \times FC \Rightarrow FC = 15$$

$$BC^2 = CF \times AC \Rightarrow 15 \times 30 = BC^2 \Rightarrow BC = 9\sqrt{2} = 12.727$$

(2) 9



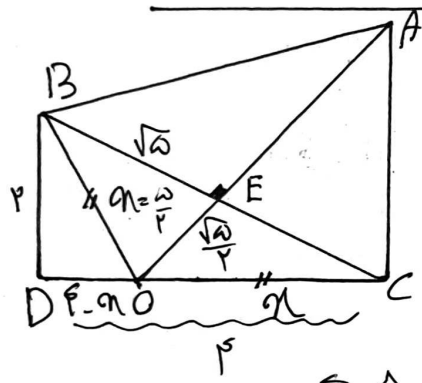
نسبت تناسلی که در مرکز مثلث برابر است

$$BD = 2DE \Rightarrow 2DE = 1 \Rightarrow DE = \frac{1}{2}$$

$$AD = \sqrt{AE^2 + DE^2} \Rightarrow \sqrt{\frac{5}{9} + \frac{1}{9}} \Rightarrow \frac{\sqrt{6}}{3} = AD$$

(2) 1/2

$$\Rightarrow AD = 2FD \Rightarrow AF = \frac{\sqrt{\frac{5}{9}} \times \frac{1}{2}}{\frac{1}{2}} = \frac{1\sqrt{10}}{2} = \sqrt{2.5}$$



$$BO = \sqrt{DO^2 + BD^2} \Rightarrow \sqrt{15^2 + 15^2} = 15\sqrt{2}$$

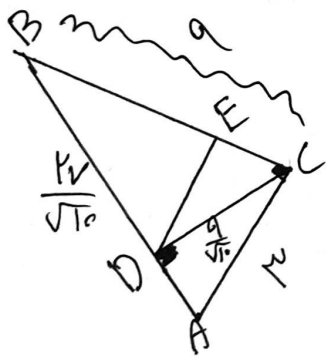
$$\Rightarrow \frac{15}{2} = \frac{15\sqrt{2}}{2}$$

$$\Rightarrow BC = \sqrt{15^2 + 15^2} \Rightarrow \frac{15\sqrt{2}}{2} = \sqrt{2} = BE = EC$$

$$EO = \frac{15}{2} = 15 + EO^2 \Rightarrow EO = \frac{15}{2} \Rightarrow (\frac{15}{2})^2 = \frac{15}{2} \times AE \Rightarrow AE = 15\sqrt{2}$$

$$\triangle ABE = \frac{1}{2} \times 15 \times 15\sqrt{2} = 15$$

(2) 1



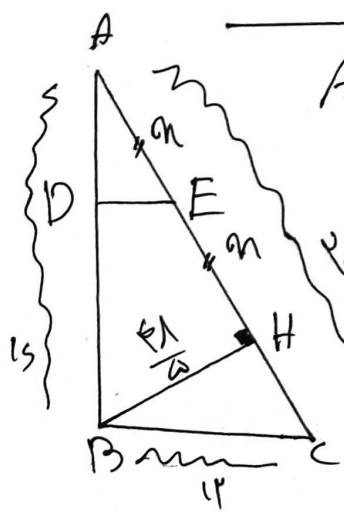
$$AB = \sqrt{AC^2 + BC^2} \Rightarrow \sqrt{9 + 11} = AB = 2\sqrt{10}$$

$$AC \times BC = AB \times CD \Rightarrow 3 \times 9 = 2\sqrt{10} \times CD \Rightarrow CD = \frac{9}{2\sqrt{10}}$$

$$BC^2 = AB \times BD \Rightarrow 11 = 2\sqrt{10} \times BD \Rightarrow BD = \frac{11}{2\sqrt{10}}$$

$$BD^2 = BE \times BC \Rightarrow \frac{11 \times 11}{10} = 9 \times BE \Rightarrow BE = 1.1$$

(2) 9



$$AC = \sqrt{12^2 + 15^2} \Rightarrow AC = 20 \quad BH \times AC = AB \times BC$$

$$\Rightarrow BH \times 20 = 15 \times 12 \Rightarrow BH = \frac{9}{2}$$

$$20 = \frac{9}{2} + 15^2 = (\frac{9}{2})^2 + 15^2 \Rightarrow 15 = 9.5$$

$$20 - 12 = 8 = HC \Rightarrow \frac{9.5}{20} = \frac{DE}{12} \Rightarrow DE = 5.7$$

(2) 10