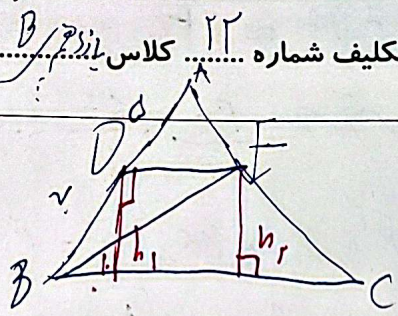
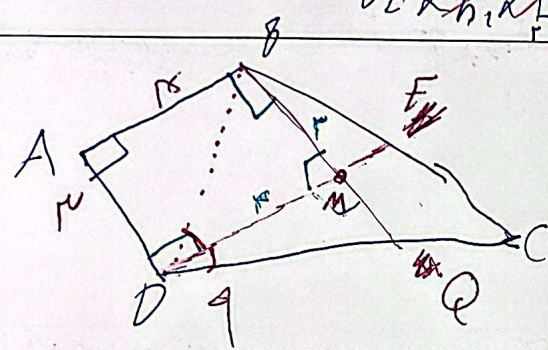


$BC \parallel DE$

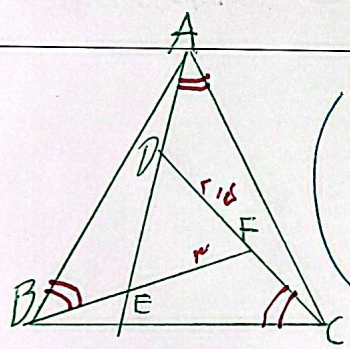


$$\frac{DE}{BC} = \frac{h_2}{h_1} \quad h_1 = h_2 \Rightarrow \frac{\triangle BDE}{\triangle BCF}$$

$$\frac{BC \times h_1}{DE \times h_2} = \frac{BC}{DE} = \frac{12}{5}$$



DE نی



$$F_1 = \angle A + \angle B \text{ و } E_1 = \angle A + \angle C \Rightarrow \triangle BCF \sim \triangle DEF \Rightarrow \frac{DF}{BF} = \frac{EF}{CF}$$

$$\frac{DF}{BC} = \frac{EF}{AB} \Rightarrow \frac{1}{1} = \frac{1}{AB} \Rightarrow AB = 1$$

کارین در این مسئله

$$2\angle B = \angle A = 90^\circ, \angle A \hat{M} F = \angle M \hat{E} B \Rightarrow \triangle BMC \sim \triangle AMF \Rightarrow AF = \frac{1}{r} = \frac{1}{\sqrt{5}}$$

$$\triangle CEF \sim \triangle MAB \Rightarrow \angle 2 = \frac{1}{r} \Rightarrow ME = \frac{1}{r} CE$$

$$F_1 = E_1, DC \parallel MB \Rightarrow ME = \frac{CE}{r} \Rightarrow ME = \sqrt{5}, CE = 2\sqrt{5} \Rightarrow MF = \frac{1}{r} + 9 \Rightarrow MF = \frac{1}{r} \sqrt{5} \Rightarrow \triangle MEF \sim \triangle MAB \Rightarrow \frac{1}{r} \sqrt{5} = \frac{1}{r} \sqrt{5}$$

$$\triangle MEF \sim \triangle MAB$$

$$F_3 \text{ و } \triangle AC \hat{D} = \triangle AC \hat{D} \Rightarrow \triangle AEC \sim \triangle ADE \Rightarrow$$

$$E_1 + E_2 = 9 + 9 + 0 = 18$$

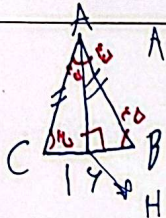
$$ED^2 = EF^2 + DF^2 \quad 14^2 + 12^2 = 100 \Rightarrow ED = 10$$

$$ED \perp FC \Rightarrow \angle EDC = 90^\circ$$

$$\frac{FC}{EF} = \frac{EF}{DF} \Rightarrow FC = 14 \times \frac{12}{10} = 16.8$$

$$BC^2 = BF^2 + FC^2 = 8^2 + 14^2 = 18^2 \Rightarrow BC = 18$$

$$BC = 18$$



می دانیم دایره محیطی مثلث قائم الزامی می باشد و در هر قائم الزامی دایره محیطی از میانه ها می گذرد

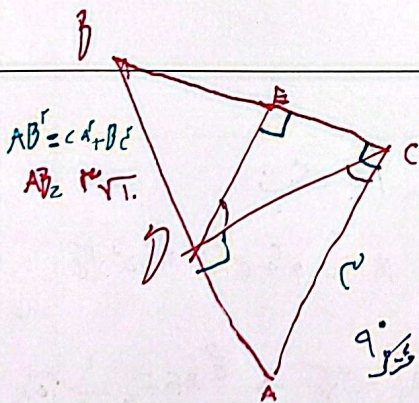
$$AH + BH^2 = AB^2 \Rightarrow 4^2 + 4^2 = 12^2 \Rightarrow AB = 12\sqrt{2}$$

فقط قائم الزامی است

$$\angle B = 90^\circ \Rightarrow EB = EC = 9$$

$$BC = 18$$

مثلث یک ذوزنقه قائم الزامی است

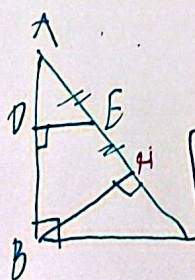


$$\triangle DCA \sim \triangle ABC \Rightarrow \frac{DC}{BC} = \frac{AC}{AB}$$

$$\frac{DC}{9} = \frac{12}{12\sqrt{2}} \Rightarrow DC = \frac{9\sqrt{2}}{10}$$

$$\frac{DE}{BA} = \frac{CE}{AC} \Rightarrow CE = \frac{AC \times DE}{BA} = \frac{12\sqrt{2} \times \frac{9\sqrt{2}}{10}}{12\sqrt{2}} = \frac{9}{10}$$

$$BC = 9 \Rightarrow BC = CE + EB = \frac{9}{10} + BE \Rightarrow BE = \frac{81}{10}$$



$$AB = 12, BC = 12 \Rightarrow AB^2 + BC^2 = AC^2 \Rightarrow AC = 12\sqrt{2}$$

$$AC = 12\sqrt{2} \Rightarrow \angle A = 90^\circ$$

$$\triangle HBC \sim \triangle ABC \Rightarrow \frac{BC}{AC} = \frac{HC}{BC} \Rightarrow \frac{12}{12\sqrt{2}} = \frac{HC}{12} \Rightarrow HC = \frac{12}{\sqrt{2}} = 6\sqrt{2}$$

$$\frac{12}{12\sqrt{2}} = \frac{HC}{12} \Rightarrow HC = \frac{12}{\sqrt{2}} = 6\sqrt{2}$$

$$HE = 9 \Rightarrow \frac{DE}{BC} = \frac{AE}{AC} \Rightarrow \frac{DE}{12} = \frac{AE}{12\sqrt{2}} \Rightarrow DE = \frac{12}{\sqrt{2}} = 6\sqrt{2}$$