

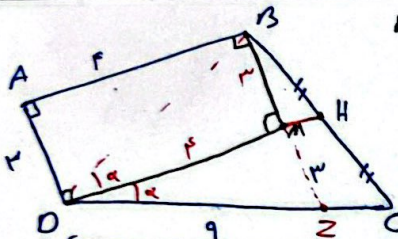
$$\frac{S_{BCE}}{S_{BDE}} = \frac{\frac{1}{2} \times BC \times h}{\frac{1}{2} \times DE \times h} = \frac{12 \times h}{0.8 \times h} = \frac{12}{0.8} = 15 \quad \checkmark$$

$$DE \parallel BC \Rightarrow \frac{AD}{AB} = \frac{DE}{BC} \Rightarrow \frac{0.8}{12} = \frac{DE}{12} \Rightarrow DE = 0.8 \text{ cm}$$

مثلث های هم ارتفاع هستند: $\triangle BCE$ و $\triangle BDE$

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$$\begin{cases} \angle BDM = \angle DMZ \\ DM = DM \end{cases} \Rightarrow \triangle BDM \cong \triangle DMZ \quad \text{در مثلث های هم راستا}$$

$$DZ = DB \quad \therefore BB^2 = BM^2 + DM^2, \quad BM = MZ = 2$$

$$DM = \sqrt{a^2 + 4} = DM = a = DZ$$

$$\frac{BM}{MZ} = \frac{BH}{HC} = 1 \Rightarrow MH \parallel ZC \Rightarrow \frac{BM}{MZ} = \frac{MH}{ZC}$$

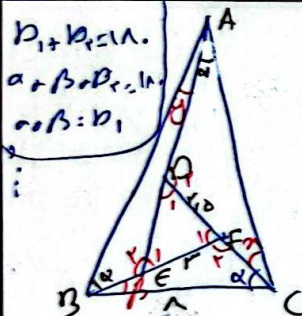
$$\Rightarrow \frac{2}{4} = \frac{MH}{4} \Rightarrow MH = 2 \quad \checkmark$$

AD || BM $\Rightarrow \angle A = \angle B = \angle A = \angle$ متساوی است $\triangle ABD$

فرض $DM = HC$

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$$\begin{aligned} D_1 + D_2 &= 180^\circ \\ \alpha + \beta + D_2 &= 180^\circ \\ \alpha + \beta &= D_1 \end{aligned}$$

$$\angle BAC = \beta$$

$$\angle BAE = \gamma$$

$$\angle ACD = \alpha$$

$$\angle A = \alpha + \gamma$$

$$\angle B = \alpha + \beta$$

$$\angle C = \alpha + \gamma$$

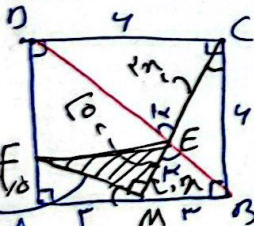
$$\Rightarrow D_1 = \alpha + \gamma \quad \text{زاویه خارجی}$$

$$E_1 = \alpha + \gamma, \quad F_1 = \alpha + \beta$$

$$AB = 9, 4 \quad \checkmark$$

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$$\angle BCE = \angle AEF$$

$$\angle A = \angle B = 90^\circ$$

$$\triangle FAM \sim \triangle MBC \quad \frac{FA}{MB} = \frac{AM}{BC}$$

$$CM = \sqrt{4 + 9} = 5$$

$$\frac{FA}{4} = \frac{5}{4} \Rightarrow FA = 5$$

$$CM = 5 \Rightarrow m \sin \alpha = 5 \sin 60^\circ \Rightarrow m = 10$$

$$FM = \sqrt{9 + \frac{9}{4}} = \sqrt{9 + \frac{9}{4}} = \frac{15}{2} = 7.5$$

$$S_{FME} = \frac{1}{2} \times \frac{15}{2} \times 5 = 37.5 \quad \checkmark$$

$$\angle DEC = \angle MEB$$

$$\angle BME = \angle DCE$$

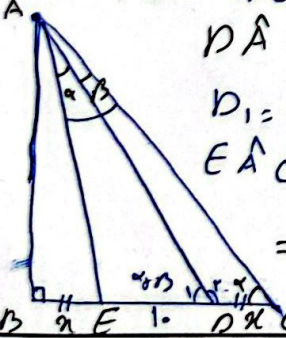
$$\angle EBM = \angle CDE$$

$$\triangle EMB \sim \triangle DEC$$

$$\frac{EM}{CE} = \frac{MB}{DC} = \frac{EM}{CE} = \frac{5}{4} = \frac{1}{4} = \frac{1}{m}$$

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$$\angle DAC = \beta$$

$$D_1 = \alpha + \beta \quad \text{زاویه خارجی}$$

$$\angle EAC = \alpha + \beta$$

$$D_1 = \angle EAC \Rightarrow \triangle AED \sim \triangle AEC$$

$$\Rightarrow \frac{AE}{10m} = \frac{1}{AE} \Rightarrow AE^2 = 10m$$

$$1 \times 1 \times m = 10 \times m \Rightarrow m = 10$$

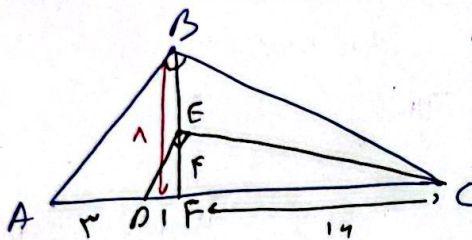
$$(m - 1)(m - 1) = 0 \Rightarrow m = 1$$

$$BE = m = BC$$

$$m = 3, \quad n = 4 \quad \checkmark$$

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

$$14 = 1 \cdot FC$$

$$FC = 14$$

$$BF^2 = AF \cdot FC$$

$$BF = \sqrt{4 \cdot 14} = 8 \Rightarrow BF = 8$$

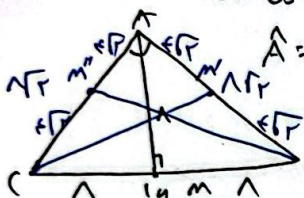
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$$BF^2 + FC^2 = BC^2 \Rightarrow \sqrt{4^2 + 14^2} = \sqrt{16(1+7^2)} = 8\sqrt{5} = BC$$

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در مثل قائم الزامیه میان دو وتر به وتر عمود است پس مثلث قائم الزامیه متساوی الساقین است.



$$AB = \sqrt{1^2 + 8^2} = \sqrt{65} = AC$$

$$BM^2 = AM^2 + AB^2$$

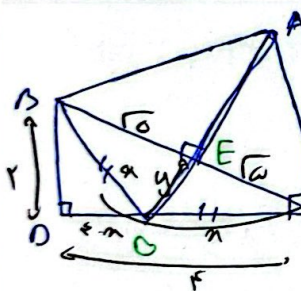
$$CM^2 = AM^2 + AC^2$$

$$AM = BM$$

$$CM = \sqrt{(1/2)^2 + (4\sqrt{5})^2} = \sqrt{1 + 80} = \sqrt{81} = 9$$

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مثلث BOC متساوی الساقین است و در مثلث متساوی الساقین ارتفاع وارد بر وتر میانه است پس BE = EC

$$10^2 = 4^2 + 9^2 \Rightarrow 100 = 16 + 81 \Rightarrow 100 = 97$$

$$BE^2 = OE \cdot EA$$

$$4^2 = \frac{1}{2} \cdot EA \Rightarrow EA = \frac{16}{2} = 8$$

$$S_{ABE} = \frac{1}{2} \cdot 10 \cdot 8 = 40$$

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$$DE \parallel AC$$

$$DE^2 = (9-m)(m)$$

$$DE = \sqrt{9m - m^2}$$

$$DE \parallel AC \Rightarrow \frac{DE}{AC} = \frac{BE}{BC}$$

$$\frac{\sqrt{9m - m^2}}{9} = \frac{m}{9} \Rightarrow \sqrt{9m - m^2} = m \Rightarrow 9m - m^2 = m^2 \Rightarrow 9m = 2m^2 \Rightarrow m = \frac{9}{2}$$

$$1 \cdot m - 1 \cdot 1 = 0$$

$$BE = m = 1/1 = 1$$

$$1 \cdot m - 9m^2 = m^2 \Rightarrow 1 \cdot m^2 - 11m = 0$$

$$m(1 \cdot m - 11) = 0$$

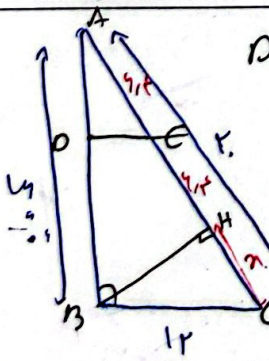
$$m = 0$$

$$1 \cdot m - 11 = 0 \Rightarrow m = 11$$

$$9(9m - m^2) = m^2$$

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$$DE \parallel BC \Rightarrow \frac{4}{12} = \frac{DE}{12} \Rightarrow \frac{4 \cdot 12}{12 \cdot 12} = DE$$

$$AB^2 + BC^2 = AC^2$$

$$AC = \sqrt{12^2 + 12^2} = 12\sqrt{2}$$

$$DE = \frac{94}{10} = 9.4$$

$$12^2 = m \cdot 12$$

$$144 = m \cdot 12 \Rightarrow m = 12$$

$$\Rightarrow n = \frac{144}{12} = 12 \Rightarrow \frac{12 - 4 \cdot 12}{12} = 4 \cdot 12 = AE = EH$$

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