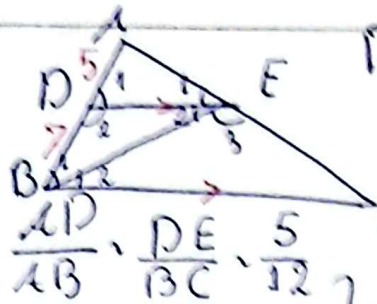




$$DE \parallel BC \rightarrow D_1, B_2, E_1, C$$

$$BEC \rightarrow B_2 + C + E_3 \rightarrow 180 + 180 - C - E_3 \rightarrow B_2$$

$$C \rightarrow 180 - E_3 - E_1 - E_2 \rightarrow [E_2, B_2]$$

$$\frac{S_{BCE}}{S_{BDE}} = \frac{\frac{1}{2} \times \sin B_2 \times BE \times BC}{\frac{1}{2} \times \sin E_2 \times BE \times DE} = \frac{12}{5} \rightarrow 2/4$$

$$BD = 5 \rightarrow BDM \rightarrow \tan \alpha = \frac{3}{4}, \sin \alpha = \frac{3}{5}, \cos \alpha = \frac{4}{5}$$

$$BDC = 2\alpha \rightarrow D(0,0), M(4,0), B(4,3)$$

$$C(9\cos\alpha, -9\sin\alpha) = (7/2, -5/4) \rightarrow \frac{1}{BC} (5/6, -1/2) \rightarrow \frac{4}{5}$$

$$ABF, CAE, BCP \rightarrow F, E, P \rightarrow F, B, P \rightarrow F, B, P \rightarrow F, B, P$$

$$DEF \sim ABC \rightarrow D_1, C, E, A, F, B \rightarrow \frac{BC}{DF} = \frac{AB}{EF} \rightarrow \frac{8}{2/5} = \frac{AB}{3} \rightarrow AB = 9/6$$

$$BMC \sim MF \rightarrow \frac{AB}{M_3 \cdot C_2} \rightarrow \frac{AF}{MB} = \frac{AM}{BC} \rightarrow AF = \frac{3}{2}$$

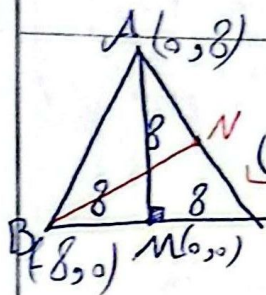
$$MBE \sim CPE \rightarrow \frac{M_1 \cdot C_1}{E_1 \cdot E_2} \rightarrow \frac{MB}{CD} = \frac{ME}{CE} = \frac{ME}{CE} = \frac{1}{2}$$

$$CM = \sqrt{36+9} = \sqrt{45} = 3\sqrt{5}, ME = \sqrt{5} \rightarrow \frac{1}{2} \times \sqrt{5} \times \frac{3}{2} \sqrt{5} = 3/75$$

$$AE = 9, BE = DC = m \rightarrow AED \sim ACE \rightarrow \frac{C}{E} = \frac{E}{A} \rightarrow \frac{10}{9} = \frac{9}{10+m} \rightarrow 9^2 \cdot 100 + 10m \rightarrow 9^2 \cdot 121 + m^2$$

$$m^2 + 121 = 100 + 10m \rightarrow m^2 - 10m + 21 = 0 \rightarrow m = 3, 7$$

$$EF^2 = FD \cdot FC = FC \cdot 16 = BF^2 \cdot \frac{AF}{FC} = BF \cdot 8 \\ \rightarrow BC = \sqrt{16^2 + 64} = \sqrt{320} = 8\sqrt{5}$$



$$AC^2 = AN^2 + NC^2 \quad AC = \sqrt{128} = 8\sqrt{2} \\ \text{M: ابتدا مختصات دایره می‌گیریم} \quad BN = \text{ایمانه هریان} \\ N(4,4) = \text{وسط } A, C \\ \sqrt{(-8-4)^2 + (4)^2} = \sqrt{160} = 4\sqrt{10}$$

$$CD \cdot AB = BC \cdot AC \rightarrow AB = \sqrt{81+9} = 3\sqrt{10} \rightarrow DC = \frac{27}{3\sqrt{10}} \\ \rightarrow DC = \frac{9\sqrt{10}}{10} \\ \frac{3}{3\sqrt{10}} = \frac{AD}{\frac{9\sqrt{10}}{10}} \rightarrow AD = \frac{3\sqrt{10}}{10} \rightarrow BD = 3\sqrt{10} - \frac{3\sqrt{10}}{10} = \frac{27\sqrt{10}}{10} \\ \frac{27\sqrt{10}}{10} = \frac{BE}{9} = \frac{9}{10} \rightarrow BE = 8.1$$

$$BO \perp OC \rightarrow 4 + (4-x)^2 = x^2 \rightarrow x = 2/5 \text{ و } DO = 1/5 \\ BE = EC = \sqrt{5} \quad \text{BE و EC برابر است پس ارتفاع میانم تر هست} \\ AOC \sim OEC \quad \frac{EO}{AO} = \frac{OC}{AC} = \frac{EC}{OC} \rightarrow OE = \frac{\sqrt{5}}{2} \\ AO = \frac{5\sqrt{5}}{2} \rightarrow AE = 2\sqrt{5} \rightarrow \frac{AE \cdot EB}{2} = \frac{2\sqrt{5} \cdot \sqrt{5}}{2} = 5$$

$$BHC \sim ABC \quad \frac{CH}{12} = \frac{12}{20} \rightarrow CH = 7.2 \rightarrow AE = EH = 6/4 \\ ADE \sim ABC \quad \frac{DE}{12} = \frac{6/4}{20} \rightarrow DE = 3/84$$