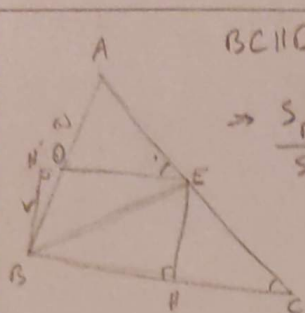


19, 175

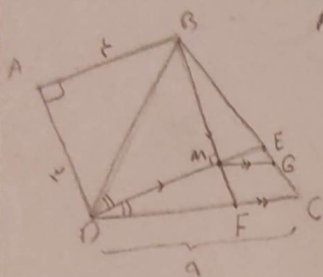
نام و نام خانوادگی پاسنامه تشریحی تکلیف شماره ۲۲ کلاس نام و نام خانوادگی (لوگو)



$$BC \parallel DE \Rightarrow EH = BH' \quad S_{BDE} = \frac{BH' \times DE}{2} \quad S_{BEC} = \frac{EH \times BC}{2}$$

$$\Rightarrow \frac{S_{BCE}}{S_{BDE}} = \frac{BC}{DE} \quad \left. \begin{matrix} \hat{A} = \hat{A} \\ \hat{C} = \hat{E} \end{matrix} \right\} \Rightarrow \triangle ADE \sim \triangle ABC \quad \frac{BC}{DE} = \frac{AB}{AD} = \frac{12}{5} = 2,4$$

1



$$ABDM \rightarrow \text{مستطیل} \Rightarrow BM = 3, DM = 1$$

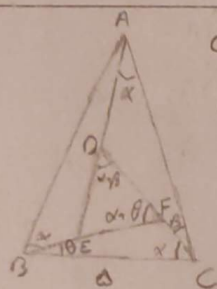
$$\left. \begin{matrix} \hat{BMD} = \hat{DMF} \\ \hat{EDC} = \hat{BDE} \\ MD = MD \end{matrix} \right\} \Rightarrow \triangle BDM \cong \triangle DMF \Rightarrow BM = MF = 3$$

$$\Rightarrow DF = \sqrt{3^2 + 4^2} = 5 \Rightarrow FC = 4 - 5 = 1$$

$$MG \parallel FC \Rightarrow \triangle BMG \sim \triangle BFC \quad \frac{BM}{BF} = \frac{BG}{BC} = \frac{1}{2} \Rightarrow \text{نقطه وسط BC است G}$$

$$\frac{MG}{FC} = \frac{1}{1} \quad \frac{MG}{1} = \frac{1}{1} \quad MG = 1$$

2



$$\hat{CAD} = \hat{ABF} = \hat{BCD} = \alpha \quad \hat{DCA} = \beta \quad \hat{FBC} = \theta$$

$$\triangle ADC : \hat{DCA} = \beta \quad \hat{DAC} = \alpha \quad \triangle DEF : \hat{EDF} = \hat{DAC} + \hat{DCA} = \alpha + \beta$$

$$\triangle BFC : \hat{FBC} = \theta \quad \hat{FCB} = \alpha \quad \triangle DFE : \hat{DFE} = \hat{FBC} + \hat{DCB} = \alpha + \theta$$

$$\left. \begin{matrix} \hat{ACB} = \hat{EDF} = \alpha + \beta \\ \hat{ABC} = \hat{DFE} = \alpha + \theta \end{matrix} \right\} \Rightarrow \triangle ABC \sim \triangle FED \quad \frac{BC}{FD} = \frac{AB}{EF} \quad \frac{a}{2a} = \frac{AB}{3}$$

$$AB = \frac{3a}{2} = 4,5$$

3

$$DC = a \quad \left. \begin{matrix} \hat{BCM} = \hat{AMF} \\ \hat{A} = \hat{B} = 90^\circ \end{matrix} \right\} \Rightarrow \triangle AMF \sim \triangle BCM \quad \frac{AM}{BC} = \frac{AF}{BM} = \frac{MF}{MC} = \frac{1}{2}$$

$$MC = \sqrt{BM^2 + CB^2} = \sqrt{\frac{a^2}{4} + a^2} = \frac{\sqrt{5}}{2} a \quad \frac{MF}{\frac{\sqrt{5}}{2} a} = \frac{1}{2} \quad MF = \frac{\sqrt{5}}{4} a$$

$$\left. \begin{matrix} \hat{DEC} = \hat{MEB} \\ \hat{CDE} = \hat{EBM} \end{matrix} \right\} \Rightarrow \triangle CDE \sim \triangle BME \quad \frac{DC}{BM} = \frac{DE}{BE} = \frac{CE}{ME} = \frac{1}{2} \quad \frac{CE}{ME} = \frac{1}{2} \quad \frac{MC}{ME} = \frac{3}{5} \quad ME = \frac{5}{3} \times \frac{\sqrt{5}}{4} a = \frac{5\sqrt{5}}{12} a$$

$$S_{EMF} = \frac{MF \times ME}{2} = \frac{\frac{\sqrt{5}}{4} a \times \frac{5\sqrt{5}}{12} a}{2} = \frac{5a^2}{16} = 1,5625$$

4

$$\hat{DAE} = \hat{ACB} = \alpha \quad \hat{ACD} : \hat{CAD} = \beta \quad \triangle ADE : \hat{ADE} = \hat{CAD} + \hat{ACB} = \alpha + \beta$$

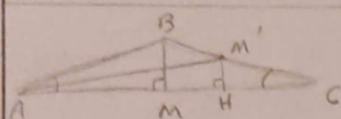
$$\left. \begin{matrix} \hat{ADE} = \hat{CAE} = \alpha + \beta \\ \hat{DAE} = \hat{ACE} = \alpha \end{matrix} \right\} \Rightarrow \triangle ADE \sim \triangle CAE \quad \frac{AE}{CE} = \frac{DE}{AE} \quad \frac{AE}{10} = \frac{10}{AE} \quad AE^2 = 10 \times 10 = 100$$

$$AE^2 = AB^2 + BE^2 = 121 + x^2 = 100 \times 100 \quad x^2 - 10x + 71 = 0 \quad (x-5)(x-14) = 0$$

$$x = 5 \quad x = 14$$

5

$$EF^2 = DF \times FC \quad EF = 14 \times FC \quad FC = 14 \quad BC^2 = CF \times AC \quad BC^2 = 14 \times 20 \\ \Rightarrow BC = 1\sqrt{10} \quad \checkmark$$



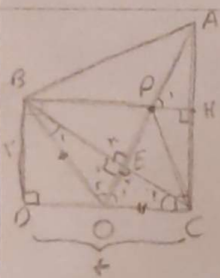
$$\left. \begin{aligned} BM &= 1 \\ CM &= \frac{AC}{2} = 1 \end{aligned} \right\} BC = \sqrt{BM^2 + CM^2} = 1\sqrt{2}$$

$$S_{ABC} = \frac{BM \times AC}{2} = \frac{1 \times 14}{2} = 7$$

$$S_{AM'C} = \frac{S_{ABC}}{2} = \frac{7}{2} = 3.5 = \frac{M'H \times AC}{2} \quad M'H = \frac{7 \times 2}{14} = 1$$

$$M'C = \frac{BC}{2} = \sqrt{2} \quad HC = \sqrt{(M'H)^2 + (M'C)^2} = \sqrt{1 + 2} = \sqrt{3} \quad AH = 14 - CH = 14 - \sqrt{3}$$

$$AM' = \sqrt{AH^2 + M'H^2} = \sqrt{(14 - \sqrt{3})^2 + 1} = \sqrt{140} = 2\sqrt{35} \quad \checkmark$$



$$\left. \begin{aligned} \hat{B}_1 = \hat{C}_1 \\ \hat{E}_1 = \hat{E}_2 = 90^\circ \end{aligned} \right\} \Rightarrow \hat{O}_1 = \hat{O}_2 \quad \left. \begin{aligned} \hat{O}_1 = \hat{O}_2 \\ \hat{B}_1 = \hat{C}_1 \end{aligned} \right\} \Rightarrow \triangle BEO \cong \triangle CEO \Rightarrow BE = CE = \frac{1}{2} BC$$

$$BC = \sqrt{BD^2 + CD^2} = \sqrt{1 + 4} = \sqrt{5} \Rightarrow BE = \sqrt{5}$$

$$BO^2 = BD^2 + OD^2 \quad OB^2 = x^2 = 1 + 4 - 1x + x^2 \quad x = \sqrt{5} \Rightarrow OD = 1$$

$$\left. \begin{aligned} OE = PE \\ BE = CE \end{aligned} \right\} \Rightarrow \triangle BPE \cong \triangle OBE \Rightarrow BP = OP \quad \triangle OEC = \triangle PEC \Rightarrow OBPC \text{ is a rhombus}$$

$$BP \parallel OC \quad BD \perp OC \Rightarrow BP \perp BD \Rightarrow BH \perp AC \Rightarrow BDCH \text{ is a rectangle} \Rightarrow PH = 1, \hat{O} \Rightarrow CH = 1$$

$$\left. \begin{aligned} \hat{O}_1 = \hat{P}_1 \\ \hat{A} = \hat{A} \end{aligned} \right\} \Rightarrow \triangle ACO \sim \triangle AHP \quad \frac{AH}{AC} = \frac{PH}{CO} = \frac{1}{\sqrt{5}} \quad \frac{AH}{20} = \frac{1}{\sqrt{5}} \quad AH = \frac{20}{\sqrt{5}} = 4\sqrt{5}$$

$$AB = \sqrt{BC^2 + AC^2} = \sqrt{1 + 4} = \sqrt{5} \quad S_{ABC} = \frac{AC \times BC}{2} = \frac{20 \times \sqrt{5}}{2} = 10\sqrt{5} \quad DC = \frac{AC \times BC}{AB} = \frac{20 \times \sqrt{5}}{\sqrt{5}} = 20$$

$$AD = \sqrt{AC^2 - DC^2} = \sqrt{4 - \frac{41}{10}} = \frac{9}{\sqrt{10}} \quad \left. \begin{aligned} \hat{B} = \hat{B} \\ \hat{C} = \hat{E} = 90^\circ \end{aligned} \right\} \Rightarrow \triangle ABC \sim \triangle DBE \quad \frac{AB}{DB} = \frac{BC}{BE}$$

$$\frac{9\sqrt{10}}{9\sqrt{10} - \frac{10}{\sqrt{10}}} = \frac{9}{BE} \quad \frac{9\sqrt{10}}{90 - 10} = \frac{9}{BE} \quad BE = \frac{9 \times 80}{80} = 9 \quad \checkmark$$

$$AC = \sqrt{AB^2 + BC^2} = \sqrt{1 + 4} = \sqrt{5} = 5 \quad AB^2 = AH \times AC \quad AH = \frac{14 \times 14}{20} = \frac{49}{5} = 9.8$$

$$\Rightarrow AE = \frac{49}{5} \quad \left. \begin{aligned} \hat{A} = \hat{A} \\ \hat{O} = \hat{H} \end{aligned} \right\} \Rightarrow \triangle ADE \sim \triangle AHB \Rightarrow \frac{AE}{AB} = \frac{DF}{BH} = \frac{5}{5}$$

$$BH^2 = AH \times CH = \frac{49}{5} \times \left(\frac{10}{5} - \frac{49}{5} \right) \quad BH = \frac{1 \times 4}{5} = \frac{4}{5} \quad \frac{DF}{\frac{4}{5}} = \frac{5}{5}$$

$$DF = \frac{5}{5} \times \frac{4}{5} = \frac{4}{5} = 0.8 \quad \checkmark$$