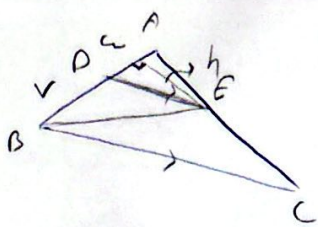


السؤال الثاني: كل من المثلثين $\triangle ABC$ و $\triangle DEF$ متشابهين. (٢٠)

$$\triangle ADE \sim \triangle ABC \rightarrow \frac{S_{ADE}}{S_{ABC}} = \left(\frac{AE}{AC}\right)^2 = \frac{12}{144} = \frac{1}{12}$$



$$S_{ADE} = \frac{ah}{2} \quad S_{DEB} = \frac{vh}{2} \rightarrow S_{DEB} = \frac{v}{a} S$$

(٢)

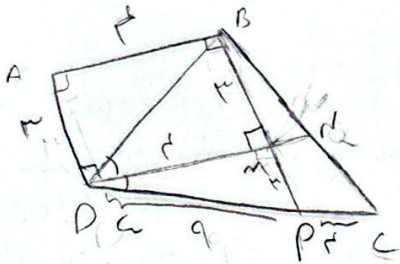
$$S_{DEC} = \frac{144}{12} S - S - \frac{v}{a} S = \frac{144S - 12S - 12S}{12} = \frac{12S}{12}$$

$$\frac{S_{DEC}}{S_{ADE}} = \frac{12S}{12S} \times \frac{a}{v} = \frac{12}{a}$$

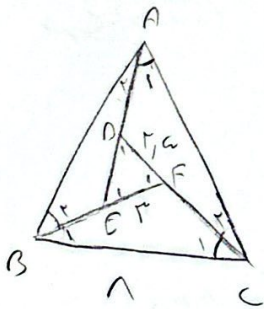
$\angle = \angle D = \angle P$ $\rightarrow$ $\triangle PDB$ $\sim$ $\triangle BPC$ (٢)

$$\frac{BP}{BC} = \frac{BP}{BC} = \frac{1}{2} \rightarrow m \parallel PC$$

$$\rightarrow \frac{m}{PC} = \frac{m}{PC} = \frac{1}{2} \quad (m=2)$$



(٢)



$$\begin{aligned} \vec{CF} + \vec{BF} &= \vec{F} \\ \vec{CF} + \vec{AF} &= \vec{D} \\ \vec{AF} + \vec{BF} &= \vec{E} \end{aligned}$$

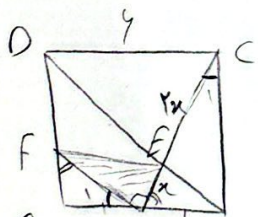
$$\vec{C} = \vec{CF} + \vec{CF} = \vec{D}$$

$$\vec{A} = \vec{AF} + \vec{AF} = \vec{E}$$

$$\triangle ABC \sim \triangle DEF \rightarrow \frac{EF}{AB} = \frac{DE}{AC} = \frac{DF}{BC}$$

$$\frac{12}{AB} = \frac{12}{12}$$

$$AB = \frac{12}{12} = 1$$



$$\vec{m} = \vec{C} \quad \vec{B} = \vec{A} \quad \rightarrow \triangle BCM \sim \triangle AFN \quad \frac{m}{f} = \frac{1}{3} = \frac{1}{3}$$

$$m = 2 \quad f = 1, 2$$

$$m = 2, f = 1, 2 \quad m = 2, f = 1, 2 \rightarrow m = 2, f = 1, 2$$

(٢)

$$S_{mfe} = \frac{m \times f}{2} = \frac{1 \times 2 \times 2}{2} = \frac{2}{2}$$

$$\frac{1}{f} = \frac{DC}{mB} = \frac{CE}{mE} = \frac{1}{2}$$

$$\left. \begin{array}{l} \hat{A}_1 = \hat{C}_1 \\ \hat{E}_1 = \hat{E}_1 \end{array} \right\} \xrightarrow{\text{شبه}} \hat{AE} = \hat{CE}$$

$$\frac{1}{AE} = \frac{AE}{1.2n}$$

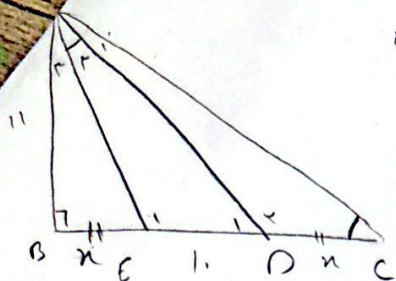
$$\frac{AE}{n+14} = 1.2 \Rightarrow 1.2$$

$$n^2 - 1.2n + 14 = 0 \quad (n-2)(n-7) = 0$$

$$n = 2$$

$$n = 7$$

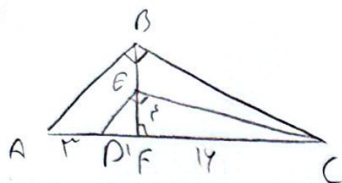
5



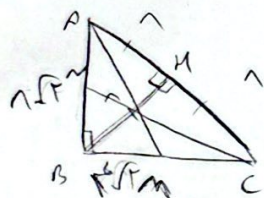
$$EF^2 = DF \times CF = 14 \quad CF = 14 \rightarrow AC = 2$$

$$BC^2 = CF \times AC = 14 \times 2 = 28 \Rightarrow BC = \sqrt{28}$$

5



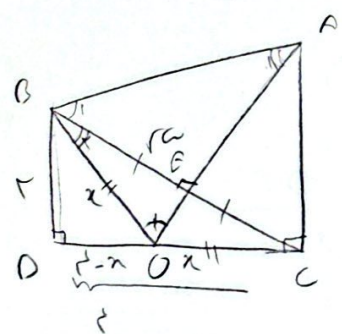
۷. مثلث قائم الزاویه متساوی الساقین است زیرا یک زاویه دارد که در هر دو طرف متساوی است. از طرفی، چون مثلث متساوی الساقین است، یک زاویه دارد که در هر دو طرف متساوی است.



$$AB^2 + BC^2 = 2AB^2 = 2 \times 7 \quad AC = AB = \sqrt{14}$$

$$Am^2 = (n/2)^2 + (CF)^2 = 14 + 14 = 28 \quad Am = \sqrt{28} = BC$$

5



$$BC^2 = 14 + 14 = 28 \quad BC = \sqrt{28}$$

$$OC = OB \rightarrow \text{در مثلث } OBE \Rightarrow BE = CE = \sqrt{14}$$

$$x^2 + (14-x)^2 = n^2 \quad (x+14-x)^2 = n^2 \quad 14 = n^2$$

$$n = 2, 4$$

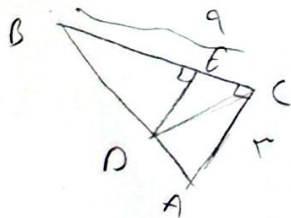
$$\left. \begin{array}{l} AO = AO \\ OB = OC \end{array} \right\} \xrightarrow{\text{شبه}} \triangle AOC \cong \triangle AOB \rightarrow \hat{B} = \hat{C} \text{ ۲۹}$$

$$OE^2 = (2.4)^2 - 4 = 9.16 - 4 = 5.16 \quad OE = \sqrt{5.16}$$

5

$$AE \times OE = BE^2 \quad AE \times \sqrt{5.16} = 4 \quad AE = \frac{4}{\sqrt{5.16}}$$

$$S_{ABE} = \frac{1}{2} BE \times AE = \frac{1}{2} \times 4 \times \frac{4}{\sqrt{5.16}} = 4$$



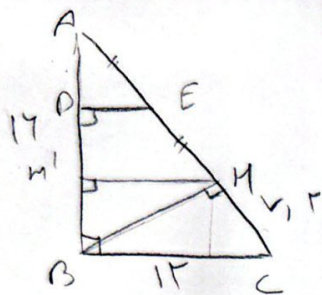
$$AB^2 / (11+9) = 9 \quad AB = \sqrt{20}$$

$$CD \times AB = AC \times BC \quad CD \times \sqrt{20} = 4 \times 9 \quad CD = \frac{36}{\sqrt{20}}$$

$$CD^2 = CE \times BC \quad \frac{36^2}{20} = CE \times 9 \quad CE = 0.9$$

$$BE = 9 - 0.9 = 8.1$$

5



$$AC = \sqrt{14^2 + 12^2} = 17$$

$$\left. \begin{array}{l} \angle C = \angle C \\ \angle H = \angle B = 90^\circ \end{array} \right\} \implies \triangle ABC \sim \triangle BCH$$

$$\frac{12}{17} = \frac{CH}{12}$$

$$CH = \frac{12 \times 12}{17} = \frac{144}{17} = 8\frac{4}{17}$$

$$MM' \parallel DE \implies \frac{AE}{AM} = \frac{AD}{AM'} = \frac{DE}{MM'} = \frac{1}{2}$$

$$AM = 17 - 8\frac{4}{17} = 8\frac{9}{17}$$

$$BM = \sqrt{12^2 - 8\frac{4}{17}^2} = 9\frac{12}{17}$$

$$MM' \times AB = AM \times BM$$

$$MM' \times 17 = 8\frac{9}{17} \times 9\frac{12}{17}$$

$$MM' = 9\frac{12}{17} \times 9\frac{12}{17}$$

$$DE = \frac{MM'}{2} = 9\frac{12}{17} \times 9\frac{12}{17} = 7\frac{12}{17}$$