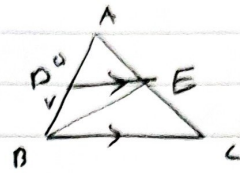
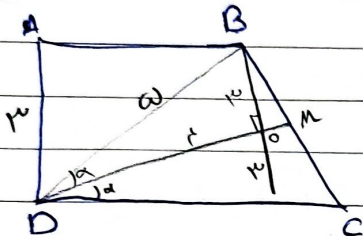


$$DE \parallel BC \rightarrow \frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} = \frac{1}{2}$$

$$\frac{S_{BCE}}{S_{BDE}} = \frac{\frac{1}{2} \times h \times BC}{\frac{1}{2} \times h \times DE} = \frac{1}{2} = \frac{1}{2}$$



②

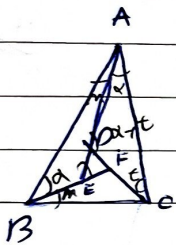


$$\hat{A} = 90^\circ \Rightarrow ABMD \text{ is cyclic} \rightarrow DM = r \quad BM = r$$

$$\hat{D} = \hat{P} \Rightarrow \angle MDP = \angle MDP \Rightarrow \angle MDP = \angle MDP \rightarrow MF = BM = r$$

$$\frac{BM}{BF} = \frac{MO}{FO} = \frac{r}{4} = \frac{1}{4} \rightarrow MO = r$$

③



$$F = E$$

$$F = \hat{B}$$

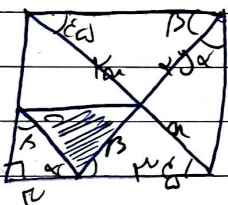
$$\hat{D} = \hat{C}$$

$$\hat{E} = \hat{A}$$

$$\Rightarrow \frac{AD}{r} = \frac{1}{r_0} \rightarrow \frac{1}{2} AB = r$$

$$AB = 9,4$$

④



$$\frac{AM}{AB} = \frac{BC}{MB} = \frac{r}{4} = \frac{1}{4} \rightarrow AF = \frac{r}{4}$$

$$MF = \sqrt{\left(\frac{r}{4}\right)^2 + r^2} = \sqrt{\frac{r^2}{16} + r^2} = \frac{r\sqrt{17}}{4}$$

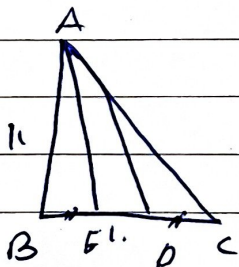
$$\hat{E} = \hat{E}$$

$$\hat{DCE} = \hat{BME} \rightarrow DCE \sim MEB \rightarrow \frac{4}{r} = \frac{1}{r} \rightarrow r = \sqrt{4 + r^2}$$

$$S_{FEM} = \frac{1}{2} \times MF \times EM = \frac{1}{2} \times \frac{r\sqrt{17}}{4} \times r = \frac{r^2\sqrt{17}}{8}$$

$$y = \sqrt{a} \quad c = r\sqrt{a}$$

⑤



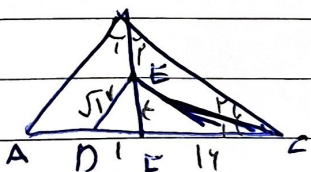
$$11^2 + a^2 \Rightarrow AE = \sqrt{11^2 + a^2}$$

$$AEC \sim ACB \rightarrow \frac{AE}{ED} = \frac{EC}{AE} \Rightarrow AE^2 = ED \times EC$$

$$11^2 + a^2 = ED \times EC \rightarrow 11^2 + a^2 = 100 + 10a$$

$$a^2 - 10a + 11 = 0 \rightarrow (a-5)^2 - 14 = 0 \rightarrow a = 5 \pm \sqrt{14}$$

⑥



$$EF^2 = DF \times FC \rightarrow 14 = 1 \times FC \rightarrow FC = 14$$

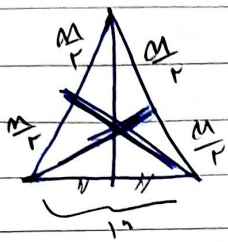
$$ED = \sqrt{14^2 + 14^2} = \sqrt{392} = 14\sqrt{2} \quad 14^2 - (\sqrt{14})^2 = EC^2 \rightarrow EC = 13\sqrt{2}$$

$$BF^2 = AF \times FC = 1 \times 14 \rightarrow BF = \sqrt{14}$$

$$BC^2 = 1^2 + 14^2 = 197 \rightarrow BC = \sqrt{197}$$

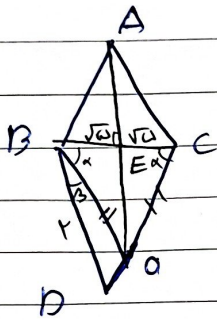
⑦

سوال (۷)



حیانه دارد در آن نصف وتر = $m^2 = 12^2 + 12^2 \rightarrow m = 12\sqrt{2}$ با توجه به $6\sqrt{2}$ تا از رویه

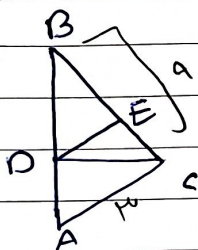
$$\sqrt{(12\sqrt{2})^2 + (12\sqrt{2})^2} = 24\sqrt{2}$$



$$BC = \sqrt{14^2 + 12^2} = 17\sqrt{2} \quad BE = EC = \sqrt{a}$$

$$\frac{17}{\sqrt{a}} = \frac{1}{AE} \rightarrow AE = \sqrt{a}$$

$$S_{ABE} = \frac{AE \times BE}{2} = \frac{\sqrt{a} \times \sqrt{a}}{2} = \frac{a}{2}$$



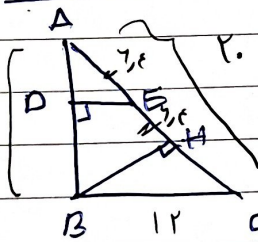
$$AB = \sqrt{16 + 9} = 5\sqrt{2}$$

$$AC)^2 = AD \times AB \Rightarrow 9 = AD \times 5\sqrt{2} \rightarrow AD = \frac{9}{5\sqrt{2}}$$

$$BD = 5\sqrt{2} - \frac{9}{5\sqrt{2}} = \frac{25 \times 2 - 9}{5\sqrt{2}} = \frac{41}{5\sqrt{2}}$$

$$\left. \begin{array}{l} DE \perp BC \\ AC \perp BC \end{array} \right\} \rightarrow DE \parallel AC \rightarrow \frac{BE}{BC} = \frac{BD}{AD}$$

$$\frac{BE}{9} = \frac{\frac{41}{5\sqrt{2}}}{5\sqrt{2}} \rightarrow BE = \frac{41}{25}$$



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

$$BC^2 = CM \times AC \Rightarrow 14^2 = CM \times 17 \rightarrow CM = \frac{196}{17}$$

$$AE = EM = \frac{1}{2} CM$$

$$\frac{PE}{12} = \frac{\frac{1}{2} \times \frac{196}{17}}{17} \rightarrow PE = \frac{49}{17}$$