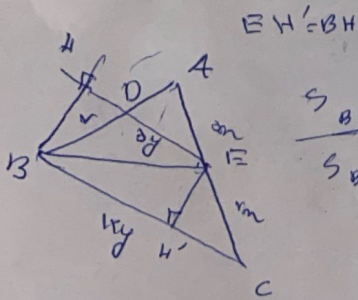
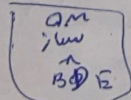
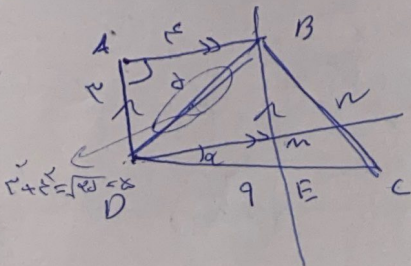


(سوال ۱)



$$\frac{S_{BDE}}{S_{BEC}} = \frac{\frac{EH \times BH}{2}}{\frac{BH \times BH}{2}} = \frac{EH}{BH} = \frac{r}{a}$$

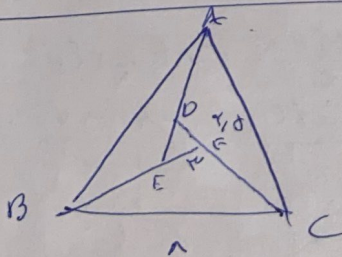
-1



$$BDE = BD = DE = a \quad EC = DC - DE = a - a = 0$$

$$BM = ME = r$$

$$\frac{BM}{ME} = \frac{BN}{NC} \rightarrow MN \parallel EC \rightarrow \frac{MN}{EC} = \frac{r}{a} \rightarrow MN = r$$



$$\frac{DF}{BC} = \frac{r}{a} \rightarrow a = 4r$$

$$BM = AM = r \quad BM \parallel DC \rightarrow BME \sim DEC \rightarrow \frac{ME}{CE} = \frac{BM}{DC} = \frac{r}{4r} = \frac{1}{4}$$

$$BCM = CM = BC + BM = 4r + r = 5r \rightarrow CM = r\sqrt{5} \rightarrow ME = \sqrt{5}r, CE = 4\sqrt{5}r$$

$$AMF \sim BCM = \frac{AM}{BC} = \frac{MF}{MC} = \frac{r}{4r} = \frac{1}{4} = \frac{MF}{r\sqrt{5}} \rightarrow MF = \frac{r}{4}\sqrt{5}$$

$$S_{MFE} = \frac{1}{2} \times ME \times MF = \frac{1}{2} \times \sqrt{5}r \times \frac{r}{4}\sqrt{5} = \frac{5r^2}{8} = \frac{5}{8}r^2$$

$$ABE = AE^2 = AB^2 + BE^2 \rightarrow 11 + m^2 = AE^2 = \sqrt{14 + m^2}$$

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

$$14 + m^2 = 10(1 + m)$$

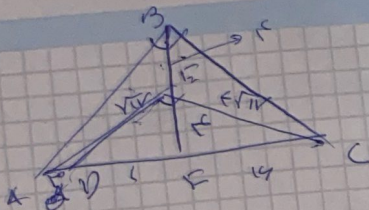
$$14 + m^2 + 10 + 10m \rightarrow m^2 - 10m + 24 = 0$$

$$(m - 4)(m - 6) = 0$$

$$m = 4, 6$$

(8)

NOTE NOTE



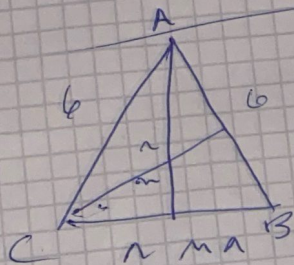
$$ED = \sqrt{1+14} = \sqrt{15}$$

$$EF = DF \times FC \rightarrow FC = 14 \rightarrow ECF = 14 \times \sqrt{15}$$

$$BF^2 = 5 \times 14 \rightarrow BF \rightarrow \sqrt{70} \rightarrow E = \sqrt{70}$$

$$BC^2 = 14^2 + 14^2 = 392$$

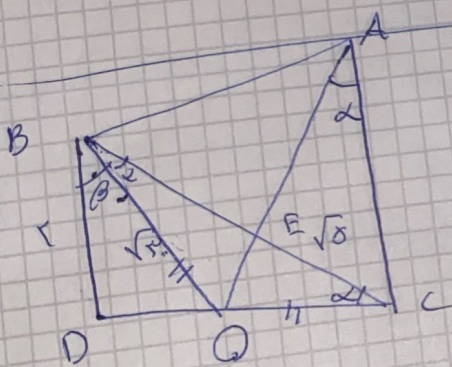
$$BC = \sqrt{392}$$



$$b^2 + b^2 = 16^2 \rightarrow 2b^2 = 256 \rightarrow b^2 = 128$$

$$b = \sqrt{128}$$

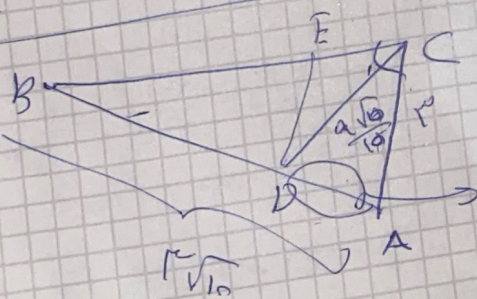
$$\sqrt{(1\sqrt{5})^2 + (2\sqrt{5})^2} = \sqrt{1+4+4+4} = \sqrt{14} = \sqrt{10}$$



$$BC = \sqrt{r^2 + r^2} + r\sqrt{2} = \sqrt{2}r + r\sqrt{2} = \sqrt{2}r$$

$$\frac{r}{\sqrt{2}} = \frac{5}{AB} = \frac{r\sqrt{2}}{8} \rightarrow AB = \frac{r\sqrt{2}}{8}$$

$$S_{ABE} = \frac{AE \times CE}{2} = \frac{r\sqrt{2} \times \sqrt{2}}{2} = 8$$



$$\sqrt{r^2 + r^2} = r\sqrt{2}$$

$$\triangle DAC \sim \triangle ABC \rightarrow \frac{AC}{AB} = \frac{DA}{AC} = \frac{DC}{BC}$$

$$\frac{r}{r\sqrt{2}} = \frac{DA}{r} = \frac{DC}{a} \rightarrow \frac{9a}{10}$$

$$\triangle BDE \sim \triangle ABC \rightarrow \frac{ED}{AC} = \frac{EB}{BC} = \frac{BD}{BA}$$

$$\frac{ED}{r} = \frac{EB}{a} = \frac{r\sqrt{2}}{r\sqrt{2}} \rightarrow EB \times r\sqrt{2} = 8$$

$$9(\sqrt{2} - \sqrt{2}) \rightarrow EB = \frac{8}{\sqrt{2}}$$

