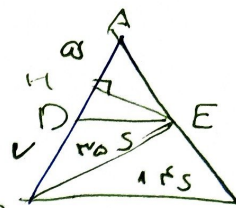


$$DE \parallel BC \rightarrow ADE \sim ABC$$

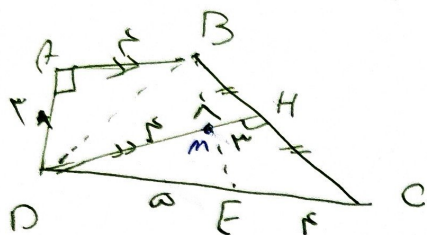
$$\left(\frac{a}{14}\right)^2 = \frac{S_{ADE}}{S_{ABC}} = \frac{r^2}{14^2}$$

$$\Rightarrow \frac{S_{BCE}}{S_{BDE}} = \frac{14^2}{r^2} = \frac{14}{r}$$



ADE, BDE

$$\frac{S_{DAE}}{S_{BDE}} = \frac{1}{\frac{1}{r} + \frac{ME}{HE}} \times \frac{AD}{BD} = \frac{1}{2} = \frac{r/2}{14/2}$$



$$M_1 = M_2 = 90^\circ$$

$$DM = DM$$

$$\rightarrow BDM \cong DME$$

$$\rightarrow BM = ME$$

$$B \in BC \text{ and } H \in M \rightarrow B^* = B^*$$

$$BMH \sim BEC$$

$$\frac{BM}{BE} = \frac{MH}{EC} \rightarrow MH = 5$$

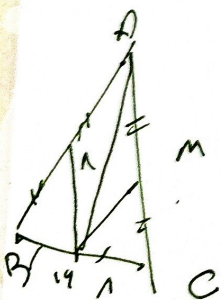
$$\rightarrow BC^2 = FC \times AC \rightarrow BC = 1\sqrt{17}$$

$$\rightarrow BF^2 = FC + AF \rightarrow BF = 1$$

$$AHC \rightarrow AC = 1\sqrt{17}$$

$$= MH = 5\sqrt{17}$$

$$AHC \xrightarrow{\text{similarity}} \frac{AC}{r} = MH$$

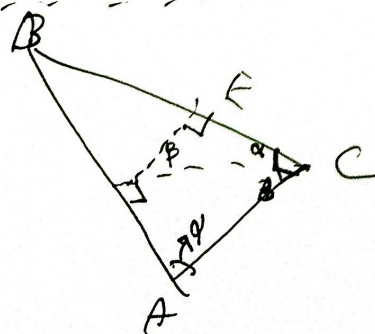


$$\sin \alpha = \frac{9}{10\sqrt{10}} = \frac{3}{10\sqrt{10}}$$

$$DC = 10 \sin \alpha = 3$$

$$EC = DC \times \cos \alpha = \frac{3}{10} \times \frac{10\sqrt{10}}{10} = \frac{3}{10}$$

$$BE = 9 \times \frac{3}{10} = \frac{27}{10}$$



$$EF^r = DF \times FC \rightarrow FC = 14 \quad BC^r = FC \times AC \rightarrow BC = 1\sqrt{10} \quad (4)$$

$$a^r + a^r = 14^r \rightarrow a = 1\sqrt{7}$$

$$2r = (1\sqrt{7})^r + (1\sqrt{7})^r \rightarrow 2r = 1\sqrt{10}$$

