

$$ED = 2AE$$

$$\frac{AE}{ED} = \frac{1}{2} \rightarrow \frac{EA}{AD} = \frac{1}{3} \xrightarrow{AD=BC} \frac{AE}{BC} = k = \frac{1}{3} \rightarrow \frac{AF}{FC} = \frac{FE}{FB} = \frac{1}{3} \Rightarrow \frac{FE}{FE+FB} = \frac{1}{4} \Rightarrow \frac{FE}{BE} = \frac{1}{4}$$

$$EB = \sqrt{10}$$

$$\triangle AEF \sim \triangle FBC$$

$$\xrightarrow{BE=\sqrt{10}} \frac{FE}{\sqrt{10}} = \frac{1}{4} \Rightarrow \frac{\sqrt{10}}{4} = EF$$

$$\hat{E} = \hat{C} \begin{cases} \text{ii) } \triangle ABC \sim \triangle AEO \Rightarrow \frac{2}{x+1} = \frac{x}{14} \rightarrow 28 = x^2 + x \rightarrow x^2 + x - 28 = 0 \rightarrow \end{cases}$$

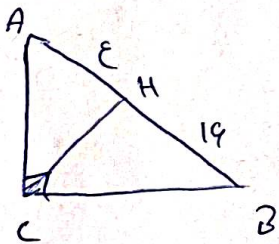
$$(x+4)(x-7) = 0 \Rightarrow \begin{cases} x = -4 \text{ و } x = 7 \\ x = 7 \end{cases}$$

$$x = \frac{7}{2} \rightarrow DE \parallel BC \xrightarrow{\text{مربع}} \frac{AE}{AC} = \left(\frac{DE}{BC} \right) \text{ و } \frac{EH}{FH} = \frac{DE}{FC} \Rightarrow \frac{x}{y} = \frac{7}{2} \rightarrow \frac{FC}{DE} = \frac{2}{7} \text{ ①}$$

$$\Rightarrow \frac{\frac{7}{2}y}{\frac{2}{7}y} = \frac{1}{\frac{7}{2}} = \frac{DE}{BC} \text{ ②}$$

$$\text{① ②} \Rightarrow \frac{BC}{DE} = \frac{7+FC}{DE} = \frac{7}{1} \Rightarrow \frac{7}{DE} + \frac{2}{7} = 7$$

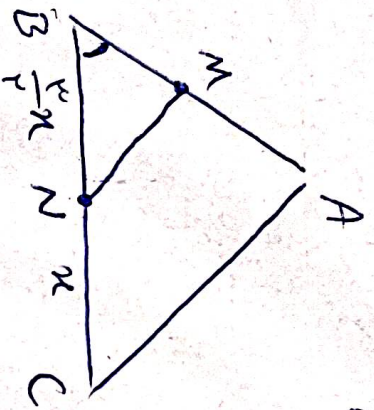
$$\hookrightarrow DE = \frac{9}{2} \text{ و } BC = \frac{9}{2} + 7 = \frac{23}{2}$$



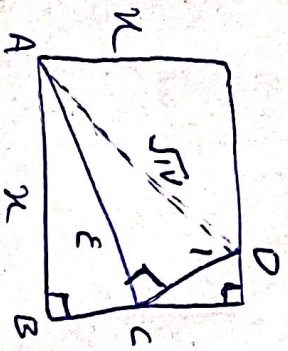
$$AC^2 = AH \times AB \rightarrow AC = \sqrt{140}$$

$$BC^2 = 10 \times 14 \rightarrow BC = \sqrt{140}$$

$$\frac{BC}{AC} = \sqrt{\frac{140}{140}} = \boxed{1}$$



$$\triangle ABC \sim \triangle BMN \Rightarrow \frac{MN}{AC} = \frac{BN}{BC} = \frac{MB}{AB} = \frac{\frac{r}{r}x}{\frac{1}{r}x} = \frac{r}{x} = k$$



$$\begin{aligned} \angle C = \angle B = 90^\circ & \Rightarrow \triangle ABC \sim \triangle ACD \\ \angle BAC = \angle ACD & \Rightarrow \frac{AC}{AD} = \frac{BC}{AC} \rightarrow \frac{x}{\sqrt{14}} = \frac{x}{x} \rightarrow x = \frac{14}{\sqrt{14}} \end{aligned}$$

$$x = \frac{14}{\sqrt{14}} = \frac{\sqrt{14}}{1}$$