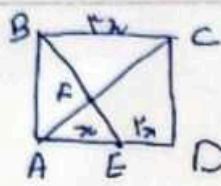


نام و نام خانوادگی: ... پاسخنامه تشریحی تکلیف شماره ۲۱ ... کلاس: ...



$\triangle AFE \sim \triangle BFC$

$$\frac{AE}{BC} = \frac{FE}{BF} = \frac{AF}{FC} = \frac{1}{4}$$

$$\frac{FE}{BF} = \frac{1}{4} \Rightarrow \frac{FE}{BE} = \frac{1}{5}$$

$$\frac{FE}{BE} = \frac{1}{5}$$

$$BE = \sqrt{(4-1)^2 + 4^2} = \sqrt{10} \Rightarrow FE = \frac{\sqrt{10}}{5}$$

$$\frac{AF}{FC} = \frac{1}{4} \Rightarrow \frac{AF}{AC} = \frac{1}{5} \Rightarrow AF = \frac{4\sqrt{2}}{5}$$

$$\frac{FE}{AF} = \frac{\frac{\sqrt{10}}{5}}{\frac{4\sqrt{2}}{5}} = \sqrt{\frac{10}{16}} = \sqrt{\frac{5}{4}}$$

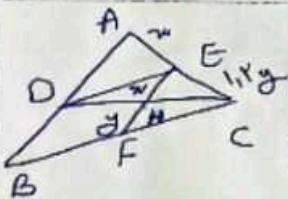
$\triangle AED \sim \triangle ABC \Rightarrow \frac{ED}{BC} = \frac{AD}{AB} = \frac{AE}{AC}$

$$\Rightarrow \frac{1}{4+1} = \frac{x}{4}$$

$$x^2 + x = 4$$

$$x^2 + x - 4 = 0 \Rightarrow (x+4)(x-1) = 0$$

$$x = -4 \text{ (رد)} \\ x = 1 \text{ (قبول)}$$



$$y = 4x \Rightarrow \frac{x}{y} = \frac{1}{4} \Rightarrow \triangle DHE \sim \triangle FHC$$

$$\frac{DE}{FC} = \frac{1}{4}$$

$$x = \frac{y}{4}$$

$$DE \parallel BC \Rightarrow \frac{AE}{AC} = \frac{DE}{BC} = \frac{y}{4y} = \frac{1}{4}$$

$$\frac{AE}{AC} = \frac{DE}{BC}$$

$$\frac{1}{4} = \frac{DE}{4}$$

$$\frac{DE}{4} = \frac{1}{4} \Rightarrow DE = 1$$

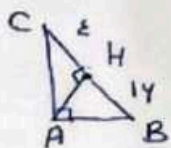
$$\frac{DE}{FC} = \frac{1}{4} \Rightarrow FC = 4$$

$$x = \frac{y}{4}$$

$$4x = 4x + 4$$

$$x = \frac{4}{5}$$

$$BC = 4x + 4 = \frac{16}{5} + 4 = \frac{36}{5}$$



$$BC = 4$$

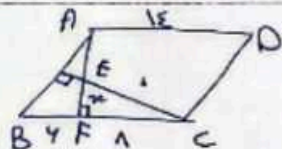
$$AC^2 = EH^2$$

$$AC = EH$$

$$AB^2 = 14 \times 4$$

$$AB = 14$$

$$\frac{AB}{AC} = \frac{14}{4} = \frac{7}{2}$$



$\triangle ABE \sim \triangle FCE$

$$\frac{AE}{FC} = \frac{BE}{FE} = \frac{AB}{FC} = \frac{1}{4}$$

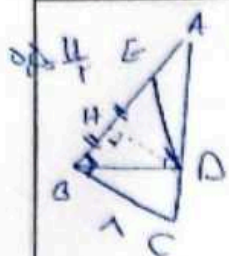
$$EA = x^2 + 14x$$

$$x^2 + 14x - EA = 0$$

$$(x+14)(x-1) = 0$$

$$x = 1$$

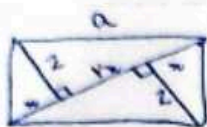
$$AF = 1 + 1 = 2$$



$$DH \parallel BC : \frac{AD}{AB} = \frac{DE}{BC} = \frac{x}{11+x}$$

$$x + 11x = 14x \Rightarrow x = 4, 4$$

$$x = 4, 4$$



$$a^2 = 4x^2 + 2^2 \rightarrow a^2 = 14x^2 \rightarrow a = \sqrt{14}x$$

$$b^2 = x^2 + 2^2 \rightarrow b^2 = 5x^2 \rightarrow b = \sqrt{5}x$$

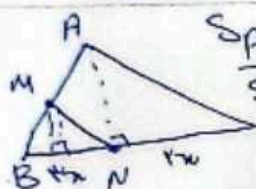
$$x = \sqrt{14}x$$

$$a^2 + b^2 = 14x^2 + 5x^2 = 19x^2$$

$$2^2 = 4x^2$$

$$x = \sqrt{4} = 2$$

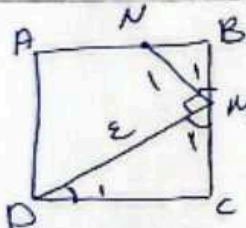
$$\frac{S_{\triangle}}{S_{\square}} = \frac{a \cdot b}{x \cdot 2} = \frac{\sqrt{14}x \cdot \sqrt{5}x}{x \cdot 2} = \frac{\sqrt{70}}{2} \approx 1.3$$



$$\frac{S_{\triangle ABC}}{S_{\triangle BMN}} = \frac{h_1 \cdot \frac{1}{2} \cdot 14x}{h_2 \cdot \frac{1}{2} \cdot x} = 14 \Rightarrow h_1 = 14h_2$$

$$h_1 \parallel h_2 \Rightarrow \frac{h_1}{h_2} = \frac{BM}{AB} = \frac{x}{14} \rightarrow \frac{AM}{AB} = \frac{13}{14}$$

$$\frac{BM}{AB} = \frac{BM}{AM} = \frac{x}{13}$$



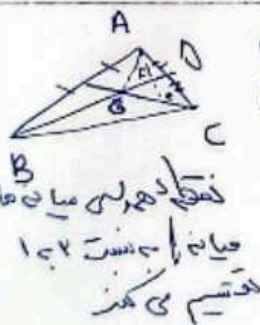
$$m_1 + m_2 = 90 \Rightarrow m_1 = 90 - m_2 \rightarrow \triangle CMN \sim \triangle BMN$$

$$\frac{MC}{BN} = \frac{MN}{NM} = \frac{CD}{BM} = \frac{x}{14}$$

$$BM = \frac{1}{14}CD \quad MC = \frac{13}{14}CD$$

$$\left(\frac{1}{14}CD\right)^2 + \left(\frac{13}{14}CD\right)^2 = 14 \Rightarrow \left(\frac{1}{14} + \frac{169}{196}\right)CD^2 = 14 \Rightarrow \frac{170}{196}CD^2 = 14 \Rightarrow CD^2 = \frac{14 \cdot 196}{170} = \frac{4900}{170} = \frac{490}{17}$$

$$S = \frac{1}{2} \cdot CD^2 = \frac{1}{2} \cdot \frac{490}{17} = \frac{245}{17}$$



$$GD = \frac{1}{14}BD \quad FD = \frac{1}{14}GD \Rightarrow FD = \frac{1}{196}BD$$

$$\frac{BD}{FD} = 196$$