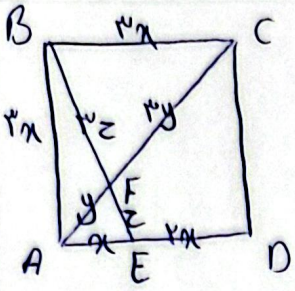
۲۰ عالی بنویس!

نام و نام خانوادگی .امیرحسین خاشعی..... پاسخنامه تشریحی تکلیف شماره ..۲۱.. کلاس ..نهم پسر.....

۱ (۲)



فیثاغورس ← $\begin{cases} BE = \sqrt{10}\,x \\ AC = 3\sqrt{2}\,x \end{cases}$ $\triangle AFE \sim \triangle BFC \rightarrow$ نسبت تشابه $= 3$

$AF = y \xrightarrow{\text{پس}} FC = 3y \rightarrow AF + FC = AC = 4y \rightarrow 3\sqrt{2}x = 4y$

$\rightarrow y = \frac{3\sqrt{2}}{4}x = AF$

$FE = z \xrightarrow{\text{پس}} BF = 3z \rightarrow FE + FB = BE = 4z \rightarrow \sqrt{10}x = 4z$

$\rightarrow z = \frac{\sqrt{10}}{4}x = FE$

$\Rightarrow \frac{FE}{AF} = \frac{\frac{\sqrt{10}}{4}x}{\frac{3\sqrt{2}}{4}x} = \sqrt{\frac{10}{18}} = \frac{\sqrt{5}}{3}$ جواب ✓

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$\xrightarrow{iii}$ $\triangle AED \sim \triangle ABC$

$\frac{AD}{AB} = \frac{AE}{AC} = \frac{DE}{BC} \xrightarrow{\text{جایگذاری از شکل}} \frac{2}{1+x} = \frac{x}{18} \rightarrow 36 = x^2 + x$

$\Rightarrow x^2 + x - 36 = 0 \Rightarrow (x+9)(x-8) = 0 \rightarrow$ غ ق ق $x = -9$

$x = 8$ ✓

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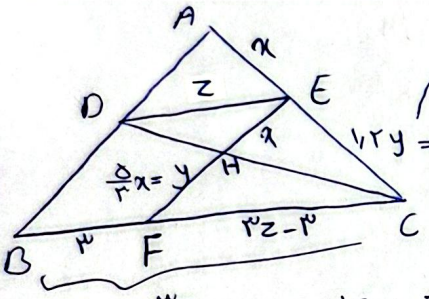

$\xrightarrow{iii}$ $\triangle DEH \sim \triangle FCH$

$\rightarrow \frac{4}{10} \times \begin{vmatrix} 3y & 5x \\ 1.2y & 2x \end{vmatrix} \times \frac{4}{10}$

$\Rightarrow 1.2y = 2x$

$\rightarrow$ تالس $\frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{x}{3x} = \frac{DE}{BC} \rightarrow DE = z$, $BC = 3z$

$\rightarrow FC = BC - BF = 3z - 3$

$\rightarrow$ تشابه $\frac{z}{3z-3} = \frac{x}{\frac{5}{3}x} \rightarrow \frac{z}{3z-3} = \frac{3}{5} \Rightarrow 9z - 9 = 5z \rightarrow z = \frac{9}{4} \Rightarrow BC = 3 \times \frac{9}{4} = \frac{27}{4}$ جواب ✓

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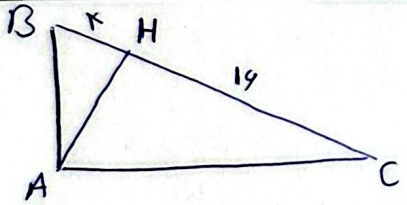

روابط طولی: $\begin{cases} AC^2 = CH \times BC \\ AB^2 = BH \times BC \end{cases}$

$AC^2 = 16 \times 20$

$AB^2 = 4 \times 20$

$\frac{AC^2}{AB^2} = \frac{16 \times 20}{4 \times 20} = 4$

$\frac{AC}{AB} = 2$ ✓

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$\xrightarrow{iii}$ $\triangle ABF \sim \triangle FEC$

$\frac{FE}{BF} = \frac{FC}{AF} \xrightarrow{FE = x} \frac{x}{6} = \frac{8}{x+8} \rightarrow x^2 + 8x = 48$

$x^2 + 8x - 48 = 0 \rightarrow (x+12)(x-4) = 0 \rightarrow$ ق ق $x = -12$ ی

$EF \rightarrow x = 4$ ✓ $AF = AE + EF$

$AF = 4 + 8 = 12$ ✓ جواب

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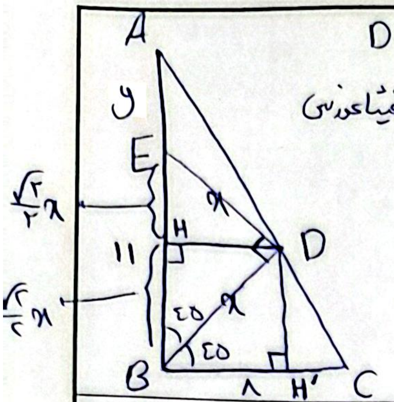

$DH = DH' = \frac{\sqrt{2}}{2}x$

فیثاغورس → $x^2+x^2=121 \to x^2 = \frac{121}{2} \to x = \frac{11}{\sqrt{2}}$

$\frac{\sqrt{2}}{2}x = \frac{\sqrt{2}}{2} \times \frac{11}{\sqrt{2}} = \frac{11}{2}$

تالس → $\frac{AH}{AB} = \frac{DH}{BC} \to \frac{y+5.5}{y+11} = \frac{5.5}{8}$

$8y+44 = 5.5y+60.5$

$2.5y = 16.5$

$y = 6.6 = AE$

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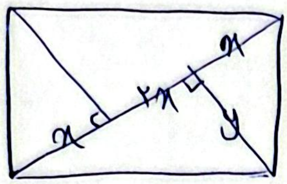

روابط طولی: $y^2 = x \times 3x = 3x^2 \to y = \sqrt{3}x$

$S_{\text{مثلث کوچک}} = \frac{x \times \sqrt{3}x}{2} = \frac{\sqrt{3}}{2}x^2$

$S_{\text{مستطیل}} = 2 \times \left(\frac{1}{2} \times 4x \times \sqrt{3}x\right) = 4\sqrt{3}x^2$

$\frac{4\sqrt{3}x^2}{\frac{\sqrt{3}}{2}x^2} = 8$

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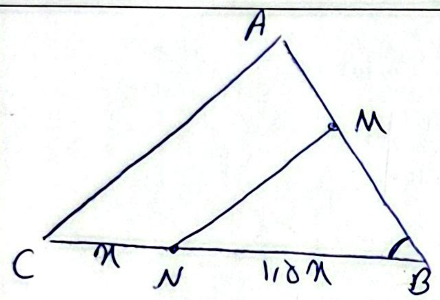

$2BN = 3NC \to BN = 1.5NC$

$\frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{2} \times \sin B \times 2.5x \times AB}{\frac{1}{2} \times \sin B \times 1.5x \times BM} = 3$

$\frac{AB}{BM} = \frac{9}{5} \to BM = \frac{5}{9}AB$, $AM = \frac{4}{9}AB$; $\frac{BM}{AM} = \frac{\frac{5}{9}AB}{\frac{4}{9}AB} = \frac{5}{4}$

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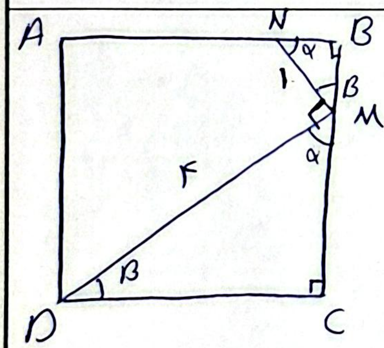

$\overset{\triangle}{BMN} \sim \overset{\triangle}{DCM}$

$\frac{NM}{DM} = \frac{BN}{CM} = \frac{BM}{DC} = \frac{1}{4}$

$BM = x$, $DC = 4x \to MC = 3x$; $MC^2 + DC^2 = 4^2$

$9x^2 + 16x^2 = 25x^2 = 16 \to x = \frac{4}{5}$; $S = (4x)^2 = 16 \times \frac{16}{25} = 10.24$ جواب

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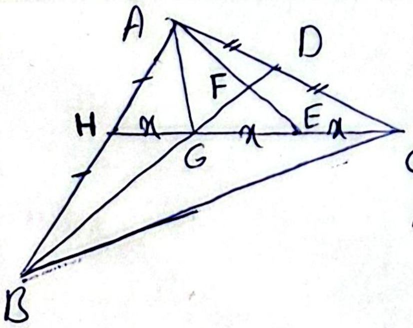
۱۰ (۲)



میانه‌ها که بهم برخورد می‌کنند، میانه را به نسبت ۱ به ۲ تقسیم می‌کنند

$\frac{CG}{GH} = \frac{2}{1} \to GH = x$

$CG = 2x \to GE + EC = 2x$

$GE = EC \to GE = EC = x$

$\overset{\triangle}{AGC}$: $AE \to$ میانه ، $GD \to$ میانه

پس → $AF = 2FE$ و $GF = 2FD$ → $FD = x$ ، $FG = 2x$

تقسیم ۱ به ۲ در میانه BC → $\frac{BG}{GD} = 2 \to \frac{BG}{FG+FD} = 2 \to \frac{BG}{3x} = 2$

$\to BG = 6x$; $\frac{BD}{FD} = \frac{BG+GF+FD}{FD} = \frac{9x}{x} = 9$ جواب