① $ED = 2AE \Rightarrow AE = \frac{1}{2}ED$ $AE = \frac{1}{3}AD$

$AB \parallel CD \rightarrow A\hat{F}E \sim A\hat{F}C$

$\frac{AF}{AC} = \frac{AE}{AD} = \frac{1}{3} \rightarrow AF = \frac{1}{3}AC$

$EF = AC - AF = \frac{2}{3}AC \rightarrow \frac{EF}{AF} = \frac{\frac{2}{3}}{\frac{1}{3}} = 2 \rightarrow EF = 2AF$

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② زاویه A مشترک   زز $ABC \sim AED$

$A\hat{E}D = \hat{C}$

$\frac{AE}{AC} = \frac{AD}{AB} \Rightarrow \frac{x}{15} = \frac{2}{x+1} \rightarrow x^2 + x - 30 = 0$

$(x+6)(x-5) = 0$

$x = -6$ غ ق ق $x = 5$

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③ $DE \parallel BC$ $3y = 5x$ $BF = 4$

$AG = x$ و $EG = \frac{12}{7}y$, $FH = y$ و $EH = x$

$DE \parallel BC \rightarrow A\hat{D}E \sim A\hat{B}C \rightarrow \frac{AE}{AC} = \frac{AF}{AB}$

$AC = AE + EC = x + \frac{12}{7}y$ $y = \frac{5}{3}x$

$\frac{AE}{AC} = \frac{x}{\frac{27}{7}x} = \frac{7}{27} = \frac{AF}{AB} \Rightarrow AB = \frac{27}{7}AF$

$\frac{BC}{DE} = \frac{AB}{AD} \Rightarrow BC = 9$

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$a^2+b^2=20^2=400$

(4)

$S=\frac{1}{2}\times 20\times 4=40$

۲۰ طول وتر

$h=\frac{ab}{c} \to h=4=\frac{ab}{20}=4 \to ab=80$

$a^2+b^2=400 \to \left(\frac{1}{2}\right)$

$a\times b=80$

~~$b=\frac{80}{a}$ ... $=400$~~

$\frac{AB^2}{AC^2}=\frac{80}{320}=\frac{1}{4}$

$\frac{AB}{AC}=\sqrt{\frac{1}{4}}=\frac{1}{2}$

(5)

$AB=8$ $AE=DC$

$BF=9$ $S=AD\times BF=12\times 9=108$

$AD=12$ $S=AE\times AF=8\times AF$

$8\times AF=108$

$AF=\frac{108}{8}=13.5$

(6)

$BC=8$ $BE=11$

$\frac{AD}{DC}=\frac{AB}{BC}=\frac{11}{8} \to \frac{AE}{AB}=\frac{AD}{AC} \to AE=AB-BC=11-8=3$

(7) $BN=NC$ $BH^2=AH.HC$

$AH=x$ $BH^2=x(2x+x)=3x^2 \to BH=x\sqrt{3}$

$HK=2x$ $S_{\text{کوچک}}=\frac{1}{2}AH.BH=\frac{1}{2}x\times x\sqrt{3}=\frac{\sqrt{3}}{2}x^2$

$KC=x$ $S_{\text{بزرگ}}=2\times\frac{1}{2}\times AC\times BH=4x\cdot x\sqrt{3}=4\sqrt{3}x^2$

$\frac{S_{\text{بزرگ}}}{S_{\text{کوچک}}}=\frac{4\sqrt{3}x^2}{\frac{\sqrt{3}}{2}x^2}=8$

رانیا جابری

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$\frac{BN}{NC} = \frac{۳}{۲}$

$\frac{BN}{BC} = \frac{۳}{۵}$

$\frac{S_{BMN}}{S_{ABC}} = \frac{BM}{AB} \times \frac{BN}{BC} = \frac{۱}{۳}$

$\frac{۱}{۳} = \frac{BM}{AB} \times \frac{۳}{۵} = \frac{BM}{AB} = \frac{۱}{۳} \times \frac{۵}{۳} = \frac{۵}{۹}$

$\frac{BM}{AM} = \frac{۵k}{۴k} = \frac{۵}{۴} = ۱/۲۵$

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۹ $d^۲ = ۴^۲ + ۱^۲ = ۱۶ + ۱ = ۱۷ \rightarrow$ قطر

$S = \frac{d^۲}{۲} = \frac{۱۷}{۲} = ۸/۵$

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۱۰ $\frac{BG}{GE} = ۲$ $\frac{CG}{GA} = ۲$ $\frac{BD}{FD} = ۹$

$\frac{A+B+C}{۳} = G$ $\frac{A+C}{۲} = D$ $\frac{۴t}{۳} = ۸ \Rightarrow \frac{۲t}{۳} = \frac{۸}{۴}$

$\frac{A+B+۴C}{۶} = \frac{C + \frac{A+B+C}{۳}}{۲} = \frac{G+C}{۲} = E$ $\frac{t}{۹} = ۸ - ۱$

$\frac{۲}{۳} = t \Rightarrow \frac{۳t}{۲} = \frac{۹t}{۹} = ۱$

$\frac{t}{۹} = \frac{۴t}{۳} - ۱$

$\frac{۸}{۹} = \frac{۲}{۳} \times \frac{۴}{۳} = ۸$ $\frac{۱}{۹} = \frac{۸}{۹} - ۱ = \frac{FD}{DB} \Rightarrow \frac{۸}{۹}$