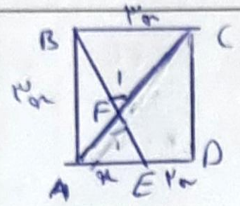
با عرض پوزش سوالات ۷ و ۸ جابه جا نوشته شده اند

نام و نام خانوادگی ......[illegible]...... پاسخنامه تشریحی تکلیف شماره ...۲۱... کلاس ......[illegible]......

۱



$ED = ۲AD \quad ABCD \rightarrow$ مربع

$\overset{\triangle}{ABC} \rightarrow (۳x)^۲ + (۳x)^۲ = AC^۲ \rightarrow AC = ۳x\sqrt{۲}$

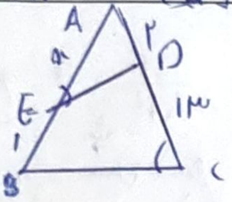
$\overset{\triangle}{ABE} \rightarrow x^۲ + ۹x^۲ = BE^۲ \rightarrow BE = x\sqrt{۱۰}$

$F_۱ = F_۱,\ B_۱ = E_۱,\ C_۱ = A_۱ \rightarrow AEF \sim BFC$ (زز)

$\frac{AE}{BC} = \frac{AF}{FC} = \frac{EF}{FB} \rightarrow \frac{۱}{۳} = \frac{AF}{FC} = \frac{EF}{FB} \rightarrow \frac{۱}{۴} = \frac{AF}{۳x\sqrt{۲}} = \frac{EF}{x\sqrt{۱۰}} \rightarrow \frac{AF}{EF} = \frac{۳\sqrt{۲}}{\sqrt{۱۰}}$

$\frac{EF}{AF} = \frac{x\sqrt{۱۰}}{۳x\sqrt{۲}} \times \frac{\sqrt{۲}}{\sqrt{۲}} = \frac{\sqrt{۲۰}}{۶} = \boxed{\frac{\sqrt{۵}}{۳}}$

۲



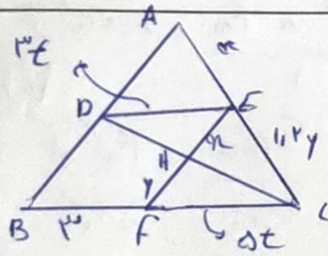
$E_۱ = C_۱,\ A_۱ = A_۱$ مشترک $\rightarrow \overset{\triangle}{ADE} \sim \overset{\triangle}{ABC} \rightarrow$ (زز) $\rightarrow \frac{AE}{AC} = \frac{ED}{BC} = \frac{AD}{AB}$

$\frac{x}{۱۵} = \frac{ED}{BC} = \frac{۲}{x+۱} \rightarrow \frac{x}{۱۵} = \frac{۲}{x+۱}$

$x^۲ + x = ۳۰ \rightarrow x^۲ + x - ۳۰ = ۰ \rightarrow (x+۶)(x-۵) = ۰ \rightarrow x = -۶ \times$ غ ق ق ، $x = ۵ \checkmark$

$\boxed{x = ۵}$

۳



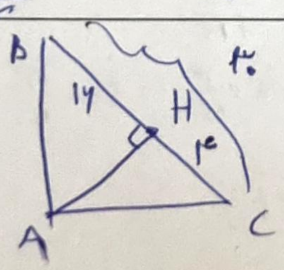
$۳y = ۵x \quad DE \parallel BC \quad BF = ۳$

$\overset{\triangle}{DHE} \sim \overset{\triangle}{HFC}$ (زز) $\rightarrow \frac{DE}{FC} = \frac{x}{y} = \frac{DE}{FC} = \frac{۳}{۵}$

$ADE \sim ABC \rightarrow$ (زز) $\rightarrow \frac{AE}{AC} = \frac{DE}{BC} \rightarrow \frac{x}{۱.۲y + x} = \frac{۳t}{۵t+۳}$

$\frac{\frac{۳}{۵}y}{\frac{۱۲y}{۵}} = \frac{۱}{۳} = \frac{۳t}{۵t+۳} \rightarrow t = \frac{۳}{۴} \rightarrow BC = \frac{۳}{۴} \times ۵ + ۳ = \frac{۱۵+۱۲}{۴} = \boxed{\frac{۲۷}{۴}}$

۴



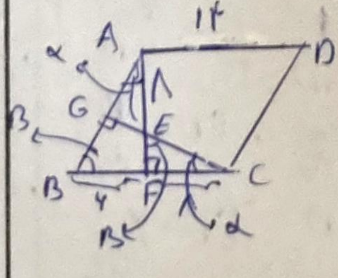
$AC^۲ = CH \times BC \rightarrow AC^۲ = ۴ \times ۲۰ \rightarrow AC = \sqrt{۲۰} \times \sqrt{۴}$

$AB^۲ = BH \times BC \rightarrow AB^۲ = ۱۶ \times ۲۰ \rightarrow AB = \sqrt{۲۰} \times \sqrt{۱۶}$

$\frac{AB}{AC} = \frac{\sqrt{۲۰} \times \sqrt{۱۶}}{\sqrt{۲۰} \times \sqrt{۴}} = \frac{۴}{۲} = ۲ \rightarrow \frac{AB}{AC} = \boxed{۲}$

$\frac{AC}{AB} = \boxed{\frac{۱}{۲}}$

۵

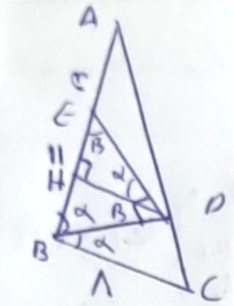


$\overset{\triangle}{ABF} \sim \overset{\triangle}{EFC} \rightarrow$ (زز) $\rightarrow \frac{BF}{EF} = \frac{BA}{EC} = \frac{AF}{FC}$

$\frac{۶}{EF} = \frac{AF}{۸} \rightarrow \frac{۶}{EF} = \frac{۸+EF}{۸} \rightarrow ۴۸ = ۸EF + EF^۲$

$(EF+۱۲)(EF-۴) = ۰ \rightarrow EF = ۴$

$AF = ۴ + ۸ = \boxed{۱۲}$



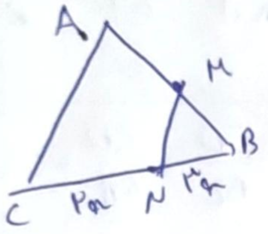
$HD \parallel BC \rightarrow \alpha = \beta \rightarrow HB = HE = \frac{11}{2} \rightarrow HB \times HE = HD^2$

Z فرعی

$\frac{11}{2} \times \frac{11}{2} = HD^2 \rightarrow HD = \frac{11}{2} \rightarrow HD \parallel BC \rightarrow$ تالس

$\frac{HD}{BC} = \frac{AH}{AB} \rightarrow \frac{\frac{11}{2}}{\frac{8}{1}} = \frac{x + \frac{11}{2}}{x+11} \rightarrow \frac{11}{16} = \frac{\frac{2x+11}{2}}{x+11}$ 6

$\frac{11}{16} = \frac{2x+11}{2x+22} \rightarrow x = \frac{33}{5} = \boxed{6.6}$



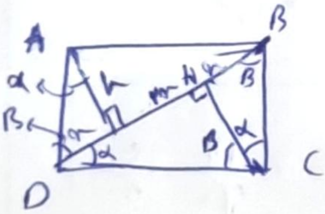
$S_{\overset{\triangle}{MBN}} = \frac{1}{2} \times NB \times MB \times \sin\hat{B}$

$S_{\overset{\triangle}{ABC}} = \frac{1}{2} \times CB \times AB \times \sin\hat{B}$

$\frac{S_{ABC}}{S_{MBN}} = \frac{\cancel{\frac{1}{2}} \times 3\cancel{x} \times MB \times \cancel{\sin B}}{\cancel{\frac{1}{2}} \times 5\cancel{x} \times AB \times \cancel{\sin B}} = 3 \rightarrow \frac{MB}{AB} = \frac{5}{9}$ (8)

تفضیل در صورت

$\frac{MB}{MA} = \boxed{\frac{5}{4}}$



$ADB \rightarrow h^2 = x \times 3x \rightarrow h = x\sqrt{3}$

$S_{مستطیل} = ADB \times 2 = \frac{x\sqrt{3} \times 4x}{\cancel{2}} \times \cancel{2} = 4x^2\sqrt{3}$ (7)

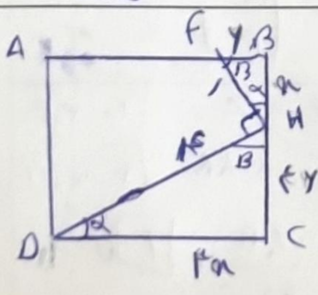
همنهشت اند $\overset{\triangle}{ADB} , DBC$

$S_{BCH} = \frac{x \times x\sqrt{3}}{2} = \frac{x^2\sqrt{3}}{2}$

کوچکترین مثلث

$\frac{S_{مستطیل}}{S_{مثلث}} = \frac{4\cancel{x^2}\cancel{\sqrt{3}}}{\frac{1 \times \cancel{x^2}\cancel{\sqrt{3}}}{2}} = \boxed{8}$

$\frac{S_{مستطیل}}{S_{مثلث}} = \boxed{8}$

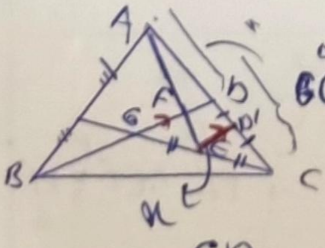


$DHC \sim HBF \rightarrow (زز) \rightarrow \frac{4}{1} = \frac{DC}{BH} = \frac{CH}{FB} \rightarrow$

$4x = 4y + x \rightarrow 3x = 4y$

$16x^2 + 9x^2 = 16 \rightarrow 25x^2 = 16 \rightarrow x = \frac{4}{5} \rightarrow 4x = \frac{16}{5}$ 9

$S_{مربع} = \frac{16}{5} \times \frac{16}{5} = \frac{256}{25} = \boxed{10.24}$



در مثلث مرکز ثقل محل تلاقی میانه ها است و میانه ها را به نسبت ۲ به ۱ تقسیم می‌کنند

$\overset{\triangle}{BCD} : ED' \parallel GD \rightarrow \frac{ED'}{GD} = \frac{EC}{GC} \rightarrow \frac{ED'}{GD} = \frac{1}{2} \rightarrow \frac{x}{GD} = \frac{1}{2}$

$\overset{\triangle}{AFD} \rightarrow \frac{FD}{x} = \frac{AD}{AD'} \rightarrow \frac{FD}{x} = \frac{2\cancel{x}}{3\cancel{x}} \rightarrow \frac{FD}{x} = \frac{2}{3}$ 10

$\frac{GD}{\cancel{2}} = \frac{3FD}{\cancel{2}} \rightarrow GD = 3FD \rightarrow BD = 3GD \qquad FD = y$

$\frac{BD}{FD} = \frac{9y}{y} = \boxed{9} \qquad BD = 9y$