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

فرض: $x = AE$ ، شعاع دایره

۱

$\hat{AFE} = \hat{BFC}$ ، $\hat{BCF} = \hat{FAE}$ (مماسی) $\Rightarrow A\hat{F}E \sim B\hat{F}C$

$BC = AE + ED \rightarrow BC = 3AE \rightarrow \frac{BC}{AE} = 3$ = نسبت تشابه

$AC^2 = AD^2 + CD^2 \rightarrow AC = 3\sqrt{2}x \rightarrow 3\sqrt{2}x = AF + CF$ ، $\frac{CF}{AF} = \frac{2}{1} \rightarrow AF = \frac{3x\sqrt{2}}{3}$

$BE^2 = EA^2 + BA^2 \rightarrow BE = x\sqrt{10} = BF + FE$ ، $\frac{BF}{FE} = \frac{2}{1} \rightarrow FE = \frac{x\sqrt{10}}{3}$

$EF \div AF = \frac{x\sqrt{10}}{3} \times \frac{3}{2x\sqrt{2}} \rightarrow \frac{\sqrt{5}}{2}$

۲

$\hat{E} = \hat{C}$ ، $\hat{A} = \hat{A} \rightarrow A\hat{E}D \sim A\hat{C}B \rightarrow \frac{2}{x+1} = \frac{x}{10} \rightarrow x^2 + x - 20 = 0$

$(x+5)(x-4) = 0 \rightarrow$ غ ق ق $x = -5$

$\rightarrow$ ق ق ق $x = 4$

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

۳

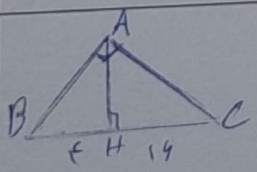
$\frac{x}{x+12y} = \frac{DE}{FC+2}$ ، $\frac{DE}{FC} = \frac{x}{y} \rightarrow \frac{FC+2}{DE} = \frac{x+12y}{x} = \frac{3x}{x} \rightarrow 3DE = FC+2$

$5DE = 3FC \rightarrow 9DE - 9 = 5DE \rightarrow DE = \frac{9}{4} \rightarrow FC = \frac{15}{4} \rightarrow$

$\rightarrow BC = \frac{15}{4} + 2 = \frac{23}{4}$

$\hat{H} = \hat{H}$ (مشترک بین دو مثلث) ، $C\hat{F}E = D\hat{E}F$ (= ۹۰) $\rightarrow D\hat{H}E \sim F\hat{H}C$

۴



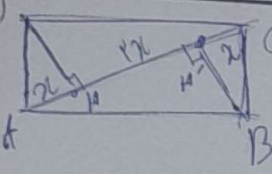
$AB^2 = 4 \times 20$ ، $AC^2 = 14 \times 20 \rightarrow \frac{AB^2}{AC^2} = \frac{4 \times 20}{14 \times 20} =$

$\rightarrow \frac{AB}{AC} = \frac{\sqrt{4}}{\sqrt{14}} = \frac{2}{4} \left(= \frac{1}{2}\right)$

$AB^2 = BH \times BC$

$AC^2 = CH \times CB$

۵

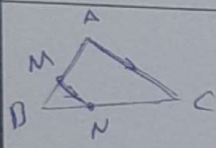


$DH = h = BH'$ ، $D\hat{A}H = \alpha \rightarrow A\hat{D}H = 90 - \alpha \rightarrow$

$\rightarrow H\hat{D}C = \alpha$ ، $D\hat{C}H = 90 - \alpha \rightarrow A\hat{D}H = C\hat{D}H$ ، ؛ ۳

$\frac{CH}{h} = \frac{h}{x} \rightarrow CH = 3x \rightarrow \frac{3x}{h} = \frac{h}{x} \rightarrow h = x\sqrt{3} \rightarrow AB^2 = AH'^2 + BH'^2$

$\rightarrow AB = 2\sqrt{3}x \rightarrow S_{\square} = 2\sqrt{3} \times 2x^2$ ، $S_{\triangle} = \frac{\sqrt{3} \times 3 \times x}{4} \rightarrow \frac{S_{\square}}{S_{\triangle}} = 8$



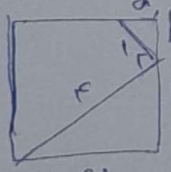
M ، N را طوری فرض می‌کنیم که MN با AC موازی شود.

$BM = 2x$ ، $BN = 3x$

$\frac{S_{BAC}}{S_{BMN}} = \frac{c^2}{1} = \frac{\sin A}{\sin B} \times \frac{AB \times CB}{2x \times 3x} \rightarrow AB \times CB = 18x^2$

$\rightarrow B\hat{N}M \cong B\hat{A}C \rightarrow \frac{BN}{BM} = \frac{3}{2} = \frac{AB}{AB} \rightarrow AB = 2\sqrt{3}x$ ، $CB = 3\sqrt{3}x$

$\frac{BM}{AM} = \frac{2x}{(2\sqrt{3}-2)x} = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$



$\rightarrow 16a^2 + 16b^2 = 4$ ، $a^2 + b^2 = 1 \rightarrow 4b = b + 4a \rightarrow 3b = 4a$

$\rightarrow 9a^2 + 9b^2 = 9 \rightarrow 9a^2 + 16a^2 = 9 \rightarrow 25a^2 = 9 \rightarrow$

$\rightarrow a = \frac{3}{5}$ ، $b = \frac{4}{5} \rightarrow 4b = \frac{16}{5}$ ضلع

$S = \text{ضلع}^2 = \frac{16}{5} \times \frac{16}{5} = \frac{256}{25}$