

نام و نام خانوادگی: شماره کلاس: تاریخ:

الف) $\left(\frac{\sqrt{2}}{2} + \left(-\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2} - \left(-\frac{\sqrt{2}}{2}\right)\right) = \left(\frac{\sqrt{2}}{2}\right)^2 - \left(-\frac{\sqrt{2}}{2}\right)^2 = \frac{2}{4} - \frac{2}{4} = \underline{\underline{-\frac{1}{2}}}$

ب) $\frac{1 + 3\left(\frac{\sqrt{3}}{2}\right)^2}{4\left(\frac{\sqrt{3}}{2}\right)^2 + 2\left(-\frac{\sqrt{3}}{2}\right)^2} = \frac{1 + 3 \cdot \frac{3}{4}}{4 \cdot \frac{3}{4} + 2 \cdot \frac{3}{4}} = \frac{1 + \frac{9}{4}}{3 + \frac{3}{2}} = \frac{\frac{13}{4}}{\frac{9}{2}} = \frac{13}{4} \cdot \frac{2}{9} = \frac{13}{18}$

الف)

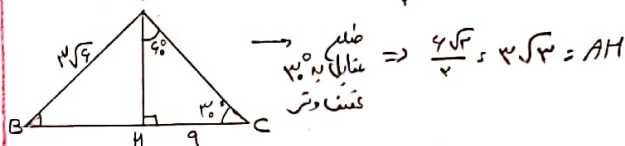


$\Rightarrow AH^2 + HC^2 = AC^2$
 $1 + HC^2 = 16$
 $HC^2 = 15$
 $HC = \sqrt{15}$

$\sqrt{5} \times \sin 60^\circ = \sqrt{3} \Rightarrow AH = \sqrt{3}$
 (مشاری است)

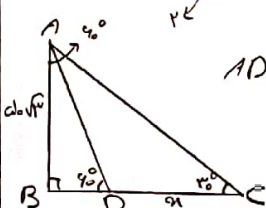
ب)

$\frac{HC}{\sin 60^\circ} = AC \Rightarrow \frac{9}{\frac{\sqrt{3}}{2}} = 4\sqrt{3}$



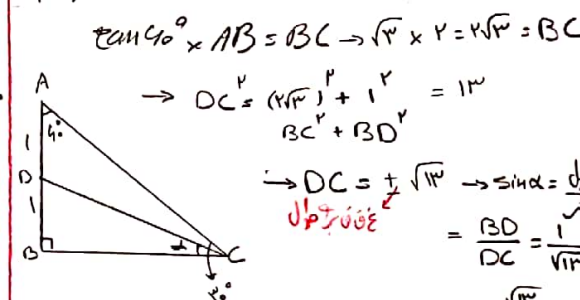
$\rightarrow AB \times \sin B = AH \rightarrow 4\sqrt{3} \times \sin 60^\circ = 3\sqrt{3}$
 $\rightarrow \sin B = \frac{\sqrt{3}}{4} \rightarrow B = 45^\circ$
 (محاربه است چون در آنجا زاویه 90 درجه است)

الف)

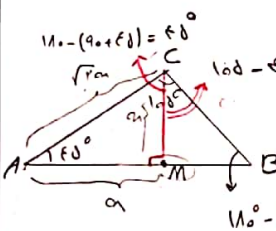


$100\sqrt{2} \times \frac{1}{\sin 45^\circ} = AC = 100\sqrt{2} \rightarrow BC = AC \times \sin 45^\circ$
 $= 100\sqrt{2} \times \frac{1}{\sqrt{2}} = 100$
 $AD = 100\sqrt{2} \times \frac{1}{\sin 45^\circ} = 100 \rightarrow 100 \times \sin 30^\circ$
 $= 50 = BD$
 $\rightarrow DC = BC - BD = 2$
 $= 100 - 50 = 50$

ب)



$\tan 45^\circ \times AB = BC \rightarrow 1 \times 1 = 1 = BC$
 $\rightarrow DC^2 = (1\sqrt{2})^2 + 1^2 = 3$
 $BC^2 + BD^2 = 1^2 + 1^2 = 2$
 $\rightarrow DC = \sqrt{2} \rightarrow \sin \alpha = \frac{BD}{DC} = \frac{1}{\sqrt{2}}$
 $\rightarrow \sin \alpha = \frac{\sqrt{2}}{2}$



$100 - (90 + 45) = 45^\circ$
 $100 - 45 = 55^\circ$
 $100 - (45 + 55) = 0^\circ$

ابتدا CM را بکشیم و از آنجا که M وسط AC است، پس $AM = CM = 50$
 $\Rightarrow AC \times \sin 45^\circ = CM$
 $\Rightarrow AC = \sqrt{2} \times 50$
 $\Rightarrow AB = BM + AM = 50(1 + \sqrt{2})$
 $\Rightarrow \frac{AB}{AC} = \frac{50(1 + \sqrt{2})}{50\sqrt{2}} = \frac{1 + \sqrt{2}}{\sqrt{2}}$

$S_{\triangle ABC} = \frac{1}{2} ab \sin C \Rightarrow$ در این مثلث B زاویه قائمه است
 $\Rightarrow S_{\triangle ABE} = \frac{1}{2} \times 2 \times 4 \times \sin \hat{B}_1$
 $S_{\triangle BCD} = \frac{1}{2} \times 4 \times 3 \times \sin \hat{B}_2$

$\Rightarrow \frac{S_{\triangle ABE}}{S_{\triangle BCD}} = \frac{\frac{1}{2} \times 2 \times 4 \times \sin \hat{B}_1}{\frac{1}{2} \times 4 \times 3 \times \sin \hat{B}_2} = \frac{4}{9}$

نسبت کمانه $k = \frac{4}{9}$ است
 نسبت کمانه $k' = \frac{9}{4}$ است

مقامت (الف)

مقامت (الف) : $S = 2 \times 2 \times \sin(120^\circ) = 4\sqrt{3}$

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مقامت (ب)

مقامت (ب) : $S = 2 \times 2 \times \frac{1}{2} \times \sin(120^\circ) = 2\sqrt{3}$

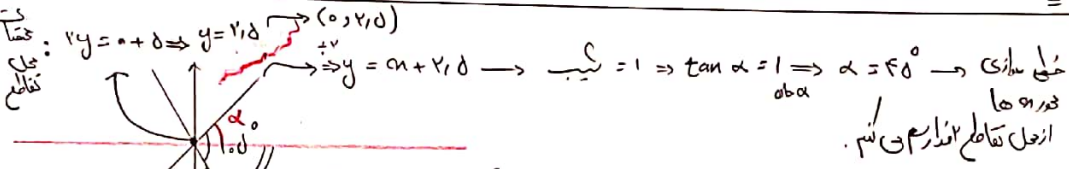
مگر θ زاویه حاده

مگر θ زاویه حاده : $\tan \theta = \frac{c}{a} = \frac{dy}{dx} \rightarrow \frac{c}{a} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 2}{2 - 1} = \frac{1}{1} = \tan \theta \rightarrow 1 + \tan^2 \theta = \frac{1}{\cos^2 \theta}$

$\rightarrow 1 + \frac{1}{1} = \frac{1}{\cos^2 \theta} \rightarrow \cos^2 \theta = \frac{1}{2} \rightarrow \cos \theta = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

مگر θ زاویه حاده

مگر θ زاویه حاده : $\sin(\pi - \theta) = \sin \theta \Rightarrow \tan(\pi - \theta) = -\tan \theta \Rightarrow \tan \theta = -\frac{1}{2} \rightarrow \dots \rightarrow \cos \theta = \frac{2}{\sqrt{5}}$



$\alpha = 45^\circ \rightarrow \tan \alpha = 1 \Rightarrow \alpha = 45^\circ$
 $\beta = 45^\circ \rightarrow \tan \beta = 1 \Rightarrow \beta = 45^\circ$
 $\alpha + \beta = 90^\circ \Rightarrow \beta = 45^\circ$
 $m = \tan \alpha = \tan 45^\circ = 1$
 $y = mx + b \rightarrow y = 1x + b \rightarrow y = x + b$
 $\frac{dy}{dx} = 1 \Rightarrow b = \frac{dy}{dx} = 1 \Rightarrow b = 1$
 $y = x + 1$

$f(\pi) = \cos(\pi + \pi) + \sin(\frac{\pi}{2} - \pi) - \tan(\frac{\pi}{2} + \pi)$

$= -\cos(\pi) + \cos(\pi) - (-\cot(\pi)) = \cot(\pi) \Rightarrow f(\frac{\pi}{2}) = \cot(\frac{\pi}{2}) = -\sqrt{3}$

$\frac{\sin(\frac{10\pi}{2} + \pi) + \cos(\frac{10\pi}{2} - \pi)}{\cos(\frac{10\pi}{2} + \pi) - \sin(\frac{10\pi}{2} - \pi)} = \frac{\sin(\frac{\pi}{2} + \pi) + \cos(\frac{\pi}{2} - \pi)}{\cos(\frac{\pi}{2} + \pi) - \sin(\frac{\pi}{2} - \pi)} = \frac{\cos(\pi) - \sin(\pi)}{-\cos(\pi) + \sin(\pi)} = -1$

$\frac{10\pi}{2} = 5\pi + \frac{\pi}{2} \Rightarrow \frac{\pi}{2}$
 $\frac{10\pi}{2} = 5\pi + \frac{\pi}{2} \Rightarrow \frac{\pi}{2}$
 $3\pi \rightarrow \pi$
 $4\pi \rightarrow 0$