آردین عباسی

۱) الف)

$$\left(\frac{\sqrt2}{2}-\frac{\sqrt3}{2}\right)\left(\frac{\sqrt2}{2}+\frac{\sqrt3}{2}\right) \to \frac{2}{4}-\frac{3}{4}=-\frac{1}{4}$$

$$\left(\frac{\sqrt2}{2}\right)^2-\left(\frac{\sqrt3}{2}\right)^2 \qquad \frac{1}{2}-\frac{3}{4}$$

ب)

$\tan 210 = \frac{\sqrt3}{3} \to \tan^2 = \frac13$

$\cos 330 = \frac{\sqrt3}{2} \to \cos^2 = \frac34$

$\cos 225 = -\frac{\sqrt2}{2} \to \cos^2 = \frac12$

$$\frac{1+3\left(\frac13\right) = 2}{4\left(\frac34\right)+2\left(\frac12\right) \quad 3+1=4} = \frac12$$

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۲) الف)

$\cos$ و $\sin 45 = \frac{\sqrt2}{2}$ $\qquad \frac{\sqrt2}{2} \Big| \frac{\sqrt3}{\sqrt6}$

قائم ABC: $(\sqrt3)^2 + \bigcirc = (2\sqrt3)^2$

$3 + 9 = 12$

$9 = x^2 \to x = 3$

-3 غیرقابل قبول است

ب)

$AH = \frac{\sqrt3}{3} \Big| \frac{3\sqrt3}{9}$ $\qquad \tan 30 = \frac{\sqrt3}{3}$

$\cos 30$, $AC = \frac{\sqrt3}{2} \Big| \frac{9}{6\sqrt3}$

$$\frac{AH}{AB} = \sin B \to \frac{3\sqrt3}{3\sqrt6} \Rightarrow \frac{\sqrt3}{\sqrt6} \Rightarrow \frac{\sqrt{18}}{6} = \frac{\sqrt2}{2} \to 45^\circ$$

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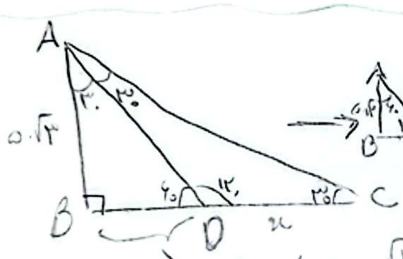
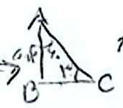
۳) الف)





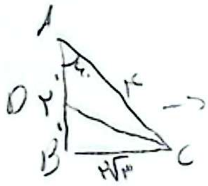
$\tan 60 = \sqrt3$

$\frac{\sqrt3}{1} \Big| \frac{150}{50\sqrt3} = BC$

$BC - BD = x \Rightarrow 150 - 50 = 100$

$\tan 30 = \frac{\sqrt3}{3} \to \frac{\sqrt3}{3} \Big| \frac{50}{50\sqrt3} = BD$

ب)



$\cos 60 = \frac12 \to \frac12 \Big| \frac{2}{4}$

$\sin 60 = \frac{\sqrt3}{2} \to \frac{\sqrt3}{2} \Big| \frac{2\sqrt3}{4}$

$1^2 + (2\sqrt3)^2 = DC^2$

$1 + 12 = 13 \to DC = \sqrt{13}$

$$\sin\alpha = \frac{1}{\sqrt{13}} = \frac{\sqrt{13}}{13}$$

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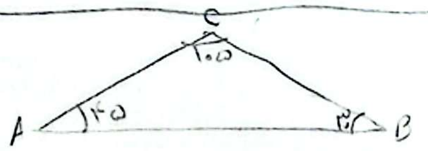
۴)



$$\frac{AB}{\sin C} = \frac{AC}{\sin B} \Rightarrow \frac{AB}{AC} = \frac{\sin C}{\sin B} \Rightarrow \frac{AB}{AC} = \frac{\sin 105}{\sin 30} \Rightarrow$$

$$\sin 105 = \sin(60+45) = \sin 60 \cos 45 + \cos 60 \sin 45 = \frac{\sqrt6+\sqrt2}{4} \Rightarrow \frac{AB}{AC} = \frac{\frac{\sqrt6+\sqrt2}{4}}{\frac12} = \frac{\sqrt6+\sqrt2}{2}$$

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۵) چون متقابل به رأس است، زاویه‌ها تاثیری ندارد.

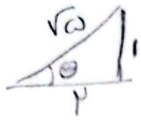
$$S = \frac{AB \sin\alpha}{2} \to \frac{\frac{2\times4\times \sin B}{2}}{\frac{6\times3\times \sin B}{2}} \Rightarrow \frac{2\times4}{6\times3} = \frac{8}{18} = \frac49$$

(۶

الف) $2\left(\frac{3\times4\times\sin120}{2}\right) \Rightarrow 3\times4\times\frac{\sqrt{3}}{2} \Rightarrow \frac{12\sqrt{3}}{2} = 6\sqrt{3}$

ب) $\frac{1}{2}ab\sin\overset{120}{\alpha} \to \frac{1}{2}\times3\times4\times\frac{\sqrt{3}}{2} \to 3\sqrt{3}$

(۷

$\tan_{\text{خط}} = \frac{4-2}{3-(-1)} = \frac{2}{4} = \frac{1}{2} \to$  $\to \cos = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

(۸

$\tan\theta = \frac{m_2-m_1}{1+m_1m_2} \Rightarrow \frac{\tan60-\tan45}{1+\tan60\tan45} = \frac{\sqrt{3}-1}{1+\sqrt{3}} \to \left|\frac{m-1}{1+m}\right| = 2+\sqrt{3}$

$\frac{1-m}{1+m} = 2+\sqrt{3} \Rightarrow m = -\frac{\sqrt{3}}{3}$ شیب خط ال

$y = x+\frac{5}{2} \to \frac{5}{2} = b$

- چون عرض ۲ از یک نقطه عرض از مبدا روی محور عرض‌ها دارند

$-\frac{\sqrt{3}}{3}\times\frac{5}{2} \Rightarrow \frac{-5\sqrt{3}}{6}$

(۹

$f(x) = -\cos+\cos-\cot \Rightarrow \cot x \qquad f\left(\frac{5\pi}{6}\right) = \cot150° \Rightarrow -\sqrt{3}$

(۱۰

$8\pi+\frac{\pi}{2} \leftarrow \sin\left(\frac{17}{2}\pi+x\right) = \sin\left(\frac{\pi}{2}+x\right) = \cos x$

$6\pi+\frac{3\pi}{2} \leftarrow \cos\left(\frac{15}{2}\pi-x\right) = \cos\left(\frac{3\pi}{2}-x\right) = -\sin x$

صورت $\cos x-\sin x$

$\cos(3\pi+x) = \cos(\pi+x) = -\cos x$

$\sin(6\pi-x) = \sin(-x) = -\sin x$

مخرج $\sin x-\cos x$

$\frac{\cos x-\sin x}{\sin x-\cos x} = -1$

$-(\cos-\sin)$