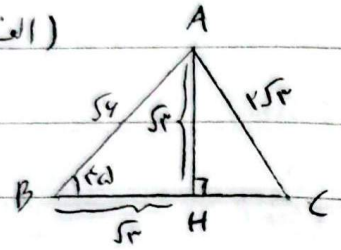
سوال ۱)

الف) $\left(\frac{\sqrt{2}-\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}+\sqrt{3}}{2}\right) = \frac{\sqrt{2}^2-\sqrt{3}^2}{4} = \frac{2-3}{4} = -\frac{1}{4}$

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

سوال ۲)

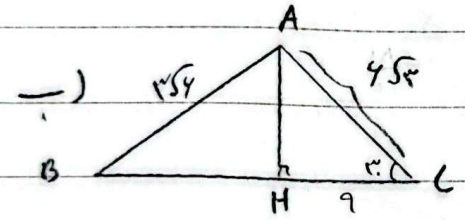
الف)



$\cos 45^\circ = \frac{\sqrt{2}}{2} \rightarrow \frac{BH}{AB_{\sqrt{6}}} \Rightarrow BH = \sqrt{3} = AH$

فیثاغورث $\Rightarrow (2\sqrt{3})^2 = (\sqrt{3})^2 + (CH)^2 \rightarrow CH = 3$

ب)



$\cos 30^\circ = \frac{9}{AC} = \frac{\sqrt{3}}{2} \rightarrow AC = \frac{18^{\times\sqrt{3}}}{\sqrt{3}_{\times\sqrt{3}}} = 6\sqrt{3}$

$\frac{AB}{\sin 30} = \frac{AC}{\sin B} \rightarrow \sin B = \frac{3\sqrt{3}}{3\sqrt{6}} = \sqrt{\frac{1}{2}} = \frac{\sqrt{2}}{2} \rightarrow B = 45^\circ$

سوال ۳)

الف) $\tan 60^\circ = \sqrt{3} \rightarrow \frac{50\sqrt{3}}{BD} \rightarrow BD = 50$

$\tan 30^\circ = \frac{1}{\sqrt{3}} \rightarrow \frac{50\sqrt{3}}{BC} \rightarrow BC = 150 \quad DC = 150 - 50 = 100$

ب) $\cot 60^\circ = \frac{1}{\sqrt{3}} \rightarrow \frac{2}{BC} \rightarrow BC = 2\sqrt{3}$

$(2\sqrt{3})^2 + 1^2 = DC^2 \rightarrow DC = \sqrt{13} \qquad \sin\alpha = \frac{1}{\sqrt{13}} = \frac{\sqrt{13}}{13}$

Subject:
Year : Month : Day : ( )

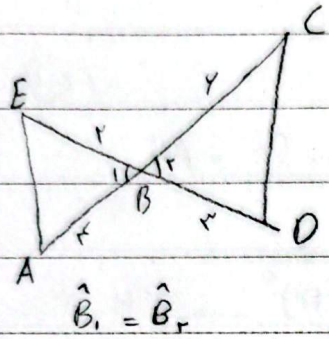
سوال ۴

$\hat{B} = 180 - (100 + 40) = 40^\circ$

$\frac{AB}{\sin C} = \frac{AC}{\sin B} \longrightarrow \frac{AB}{AC} = \frac{\sin C}{\sin B} = \frac{\sin(40+40)}{\sin 40} = \frac{\sin 40 \cos 40 + \sin 40 \cos 40}{\sin 40}$

$= \frac{\frac{\sqrt{3}}{2} \times \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \times \frac{1}{2}}{\frac{1}{2}} = 2\left(\frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}\right) = \frac{\sqrt{6}+\sqrt{2}}{2}$

سوال ۵



$\hat{B}_1 = \hat{B}_2$

$S_{\triangle AEB} = \frac{1}{2} \times 2 \times 4 \times \sin B_1 = 4 \sin B$

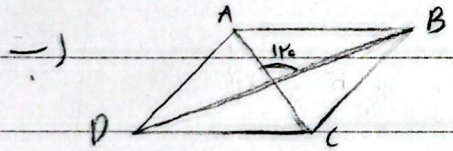
$S_{\triangle BCD} = \frac{1}{2} \times 3 \times 6 \times \sin B_2 = 9 \sin B_2$

نسبت دو مثلث $\longrightarrow \frac{4 \sin B}{9 \sin B} = \frac{4}{9}$

سوال ۶

الف) $S_{\text{متوازی الاضلاع}} = 2 \times S_{\text{مثلث}} = 2 \times \frac{1}{2} \times 4 \times 3 \times \sin 120^\circ = 4\sqrt{3}$

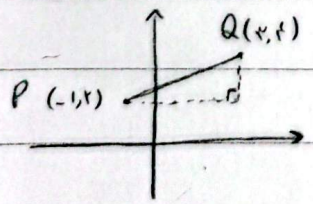
ب)

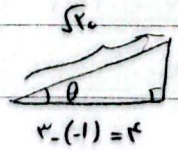


$S_{ABCD} = \frac{1}{2} AC \times BD \times \sin 120^\circ =$

$\frac{1}{2} \times 3 \times 4 \times \frac{\sqrt{3}}{2} = 3\sqrt{3}$

سوال ۷

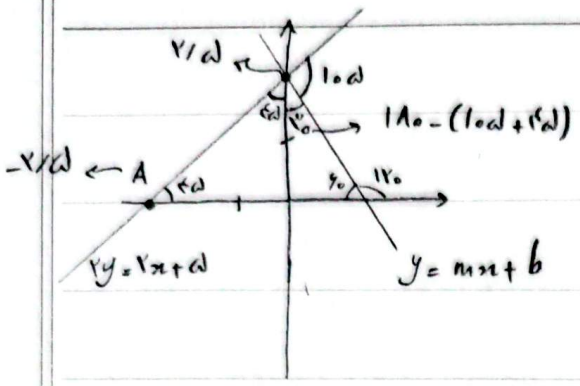




$2^2 + 4^2 = x^2 \longrightarrow x = \sqrt{20}$

$\cos\theta = \frac{4}{\sqrt{20}} = \frac{4}{2\sqrt{5}} = \frac{2}{\sqrt{5}}$

Date : ..../..../....



سوال ۸)

$2y = 2x + 5 \rightarrow y = x + 2/5$

$A: \ y = 0 \rightarrow 0 = x + 2/5 \rightarrow x = -2/5$

$m = \tan 120^\circ = -\sqrt{3}$, $b = 2/5$ (عرض از مبدأ)

(هر ۲ خط یکسان است)

$$mb = -\sqrt{3} \times \frac{5}{2} = \frac{-5\sqrt{3}}{2}$$

سوال ۹)

$$f(x) = -\cos x + \cos x - (-\cot x) = \cot x$$

$$f\left(\frac{5\pi}{6}\right)_{\rightarrow 150^\circ} = \cot\left(\frac{5\pi}{6}\right) = -\sqrt{3}$$

سوال ۱۰)

$$\frac{\sin\left(\frac{17\pi}{2} + x\right) + \cos\left(\frac{15\pi}{2} - x\right)}{\cos(4\pi + x) - \sin(4\pi - x)} = \frac{\cos x - \sin x}{-\cos x - (-\sin x)} = \frac{\cos x - \sin x}{-(\cos x - \sin x)} = -1$$

$\frac{(12+3)\pi}{2}$

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