نام و نام خانوادگی : سپهر بیالی تکلیف شماره : ۲۰ کلاس : دهم پسر A

الف) $\left(\frac{\sqrt{۲}}{۲}+\left(-\frac{\sqrt{۳}}{۲}\right)\right)\left(\frac{\sqrt{۲}}{۲}+\frac{\sqrt{۳}}{۲}\right)=\frac{۲}{۴}-\frac{۳}{۴}=-\frac{۱}{۴}$

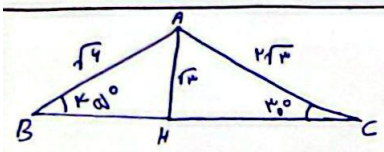
$\sin ۴۵^\circ=\frac{\sqrt{۲}}{۲}$ $\sin ۳۰۰^\circ=-\frac{\sqrt{۳}}{۲}$ $\cos ۴۱۵^\circ=\frac{\sqrt{۲}}{۲}$ $\cos ۱۵۰^\circ=-\frac{\sqrt{۳}}{۲}$

ب) $=\frac{۱+۱}{۳+۱}=\frac{۲}{۴}=\frac{۱}{۲}$

$\tan ۲۱۰^\circ=\frac{-\frac{۱}{۲}}{-\frac{\sqrt{۳}}{۲}}=\frac{۱}{\sqrt{۳}}\longrightarrow \frac{۱}{\sqrt{۳}}\times\frac{۱}{\sqrt{۳}}=\frac{۱}{۳}\times ۳=۱$

$۲\cos^۲ ۲۲۵^\circ=\frac{۲}{۴}\times ۲=۱$

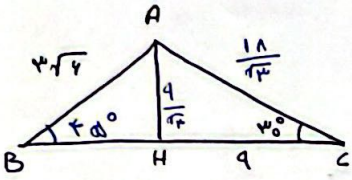
$۴\cos^۲ ۳۰^\circ=\frac{۳}{۴}\times ۴=۳$



$\sin ۴۵^\circ=\frac{\sqrt{۲}}{۲}=\frac{AH}{\sqrt{۴}}$ $۲AH=\sqrt{۱۴}$ $۲AH=۲\sqrt{۳}$ $AH=\sqrt{۳}$

$\sin C=\frac{\sqrt{۳}}{۲\sqrt{۳}}=\frac{۱}{۲}\Rightarrow C=۳۰^\circ$ $\cos ۳۰^\circ=\frac{\sqrt{۳}}{۲}=\frac{HC}{۲\sqrt{۳}}\Rightarrow ۲HC=۶$

$HC=۳$



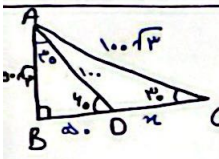
$\cos ۳۰^\circ=\frac{\sqrt{۳}}{۲}=\frac{۹}{AC}=\sqrt{۳}AC=۱۸\Rightarrow AC=\frac{۱۸}{\sqrt{۳}}$

$\sin ۳۰^\circ=\frac{۱}{۲}=\frac{AH}{\frac{۱۸}{\sqrt{۳}}}\Rightarrow\frac{۱}{۲}=\frac{AH\sqrt{۳}}{۱۸}=۲AH\sqrt{۳}=۱۸$

$\Rightarrow AH=\frac{۹}{\sqrt{۳}}$

$\sin B=\frac{\frac{۹}{\sqrt{۳}}}{\frac{۱۸}{\sqrt{۳}}}=\frac{۲\not{۹}}{\sqrt{۳}}\times\frac{۱}{۳\not{۹}\sqrt{۳}}=\frac{۲}{۱۸}=\frac{۲}{۳۶\sqrt{۳}}=\frac{۱}{۱۲}\times\frac{\sqrt{۳}}{\sqrt{۳}}=\frac{\sqrt{۳}}{۳}$

$B=۶۰^\circ$



$\sin ۶۰=\frac{\sqrt{۳}}{۲}=\frac{۵۰\sqrt{۳}}{AD}\Rightarrow\sqrt{۳}AD=۱۰۰\sqrt{۳}$ $AD=۱۰۰$

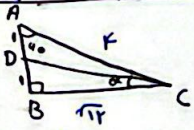
$A=۳۰^\circ\Rightarrow\sin ۳۰=\frac{۱}{۲}=\frac{BD}{۱۰۰}$

$۲BD=۱۰۰$ $BD=۵۰$

$C=۳۰^\circ=\sin ۳۰^\circ=\frac{۱}{۲}=\frac{۵۰\sqrt{۳}}{AC}\Rightarrow AC=۱۰۰\sqrt{۳}$

$BC^۲=AC^۲-AB^۲\Rightarrow BC^۲=۳۰۰۰۰-۷۵۰۰=۲۲۵۰۰\Rightarrow BC^۲=BC=۱۵۰$

$x=۱۵۰-۵۰=۱۰۰$



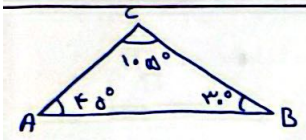
$\cos ۶۰^\circ=\frac{۱}{۲}=\frac{۲}{AC}$

$AC=۴$

$BC^۲=AC^۲-AB^۲=۱۶-۴=۱۲\Rightarrow BC=\sqrt{۱۲}$

$DC=\sqrt{۱۲+۱}=\sqrt{۱۳}$

$\sin\alpha=\frac{۱}{\sqrt{۱۳}}$



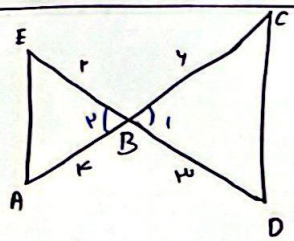
$\frac{AB}{\sin ۱۰۵^\circ}=\frac{AC}{\sin ۳۰^\circ}\Rightarrow\sin ۱۰۵^\circ=\sin ۱۰۵^\circ$ $\overset{\alpha}{۴۵^\circ}+\overset{B}{۶۰^\circ}=۱۰۵^\circ$

$\sin ۱۰۵^\circ=\sin\alpha\cos B+\sin B\cos\alpha=$

$\left(\frac{\sqrt{۲}}{۲}\times\frac{۱}{۲}\right)+\left(\frac{\sqrt{۳}}{۲}\times\frac{\sqrt{۲}}{۲}\right)$

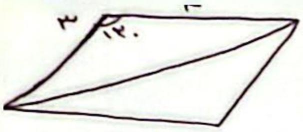
$=\frac{\sqrt{۲}+\sqrt{۶}}{۴}$

$\frac{AB}{AC}=\frac{\sin ۱۰۵^\circ}{\sin ۳۰^\circ}=\frac{\sqrt{۲}+\sqrt{۶}}{۴}\times\frac{۴}{۱}=\frac{\sqrt{۲}+\sqrt{۶}}{۲}$



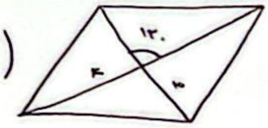
$B_۱=B_۲\longrightarrow$ متقابل به رأس

$\frac{S_{ABE}}{S_{BCD}}=\frac{\frac{۱}{۲}\not{\sin} B_۲\times ۴\times ۲}{\frac{۱}{۲}\not{\sin} B_۱\times ۳\times ۶}=\frac{۸}{۱۸}=\frac{۴}{۹}$



$S = 2\left(\frac{1}{2}\sin 120 \times 4 \times 3\right)$

$\frac{1}{2} \times \frac{\sqrt{3}}{2} \times 4 \times 3 = \frac{\sqrt{3}}{4} \times 4 \times 3 = 3\sqrt{3} \times 2 = 6\sqrt{3}$

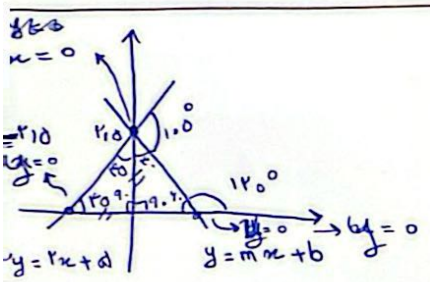
ب) 

$S = \frac{1}{2} \times \sin 120^\circ \times 3 \times 4 = \sin 120 \times 6 = \frac{\sqrt{3}}{2} \times 6 = 3\sqrt{3}$

$a = \frac{4-2}{3-(-1)} = \frac{2}{4} = \frac{1}{2} \rightarrow \tan$ زاویه

$1 + \tan^2\alpha = \frac{1}{\cos^2\alpha}$

$1 + \frac{1}{4} = \frac{1}{\cos^2\alpha} = \frac{5}{4} = \frac{1}{\cos^2\alpha} \rightarrow \cos^2\alpha = \frac{4}{5} \Rightarrow \cos\alpha = \frac{2}{\sqrt{5}}$



$y = 2x + 5$ $\quad y = mx + b$

$2y = 0 + 5$ $\quad 2 \times 0 = 2x + 5$

$y = 2.5$ $\quad x = -2.5$

$m =$ شیب خط $= \tan(120) = -\sqrt{3}$

$b \xrightarrow{\text{عرض از مبدا}} y = 2.5 \Rightarrow 2.5 = 0 + b$

$b = 2.5$

$mb = -\sqrt{3} \times 2.5$

$f\left(\frac{5\pi}{6}\right) = \cos\left(\pi + \frac{5\pi}{6}\right) + \sin\left(\frac{\pi}{2} - \frac{5\pi}{6}\right) - \tan\left(\frac{3\pi}{2} + \frac{5\pi}{6}\right)$

$\tan\frac{14\pi}{6} = \frac{7\pi}{3}$

$\cos\left(\pi + \frac{5\pi}{6}\right) = \cos\left(\frac{6\pi}{6} + \frac{5\pi}{6}\right) \rightarrow \cos\frac{11\pi}{6}$

$\sin\left(\frac{\pi}{2} - \frac{5\pi}{6}\right) = \sin\left(\frac{3\pi}{6} - \frac{5\pi}{6}\right) \rightarrow \sin -\frac{2\pi}{6}$

$\cos\frac{11\pi}{6} \rightarrow 2\pi - \frac{\pi}{6} = \frac{\sqrt{3}}{2}$ $\quad \sin -\frac{2\pi}{6} = -\frac{\sqrt{3}}{2}$ $\quad \tan\frac{7\pi}{3} \rightarrow \tan\left(\frac{\pi}{3}\right) = \sqrt{3}$

$f\left(\frac{5\pi}{6}\right) = \frac{\sqrt{3}}{2} + \left(-\frac{\sqrt{3}}{2}\right) - \sqrt{3} = \boxed{-\sqrt{3}}$

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

$\cos x - \sin x \longrightarrow$ صورت

$(\cos 3\pi + x) = -\cos x$ $\quad \cos(6\pi - x) = -\sin x$

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