Subject: دهم دختر B « جواب تکلیف شماره ۲۰ » مهتا سلطور

سؤال ۱)

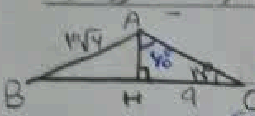
الف) $(\frac{\sqrt2}{2}-\frac{\sqrt3}{2})(\frac{\sqrt2}{2}+\frac{\sqrt3}{2}) = \frac{1}{2}-\frac{3}{4} = \frac{-1}{4}$

ب) $\frac{1+(3\times(\frac{\sqrt3}{3})^2)}{(4\times(\frac{\sqrt3}{2})^2)+(2\times(\frac{-\sqrt2}{2})^2)} = \frac{1+1}{3+1} = \frac{2}{4} = \frac{1}{2}$

سؤال ۲)

الف) ضلع روبه‌رو به زاویه ۴۵° (AH) $\frac{\sqrt2}{2}$ وتر است ⇐ $AH=\frac{\sqrt2}{2}\times\sqrt6=\sqrt3$

⇒ فیثاغورث ⇒ $(AC)^2=(AH)^2+(HC)^2 \Rightarrow 12=3+(HC)^2 \Rightarrow (HC)^2=9 \Rightarrow HC=3$



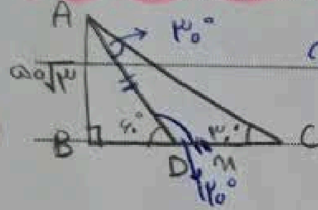
ب) ضلع روبه‌رو به زاویه ۶۰°، $\frac{\sqrt3}{2}$ وتر است ⇒ $AC\times\frac{\sqrt3}{2}=9 \Rightarrow AC=6\sqrt3$

$\Rightarrow \frac{c}{\sin C}=\frac{b}{\sin B} \Rightarrow \frac{3\sqrt6}{\frac12}=\frac{6\sqrt3}{\sin B} \Rightarrow 6\sqrt6=\frac{6\sqrt3}{\sin B}$

$\sin B=\frac{1}{\sqrt2}=\frac{\sqrt2}{2} \Rightarrow B=45°$

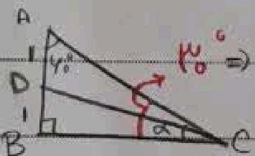
سؤال ۳)

الف)



ضلع روبه‌رو به زاویه ۶۰°، $\frac{\sqrt3}{2}$ وتر است. $x=AD=DC$

$x=DC=AD=100$ ⇐ $\frac{\sqrt3}{2}AD=50\sqrt3$ ⇐ وتر $=AD$



ب) ضلع روبه‌رو به زاویه ۳۰° نصف وتر است ⇐ $30°$

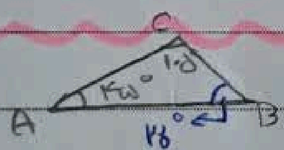
$AB=\frac12 AC \Rightarrow AC=4$

$(AC)^2-(AB)^2=(BC)^2 \Rightarrow 16-4=12 \Rightarrow BC=2\sqrt3 \Rightarrow (DC)^2=(BD)^2+(BC)^2$

$(DC)^2=1+4 \Rightarrow DC=\sqrt5 \Rightarrow \frac{DC}{\sin B}=\frac{BD}{\sin\alpha} \Rightarrow \frac{\sqrt5}{\frac{\sqrt2}{2}}=\frac{1}{\sin\alpha} \Rightarrow \sin\alpha=\frac{2\sqrt5}{\sqrt2}$

$\sin\alpha=\sqrt{10}$

سؤال ۴)



$AC=b,\ AB=c,\ CB=a$

$\frac{a}{\sin 15°}=\frac{b}{\sin 30°}=\frac{c}{\sin 105°} \Rightarrow 2b=\frac{c}{\sin 105°} \Rightarrow 2b\times\sin 105°=c$

$\frac{AB}{AC}=\frac{c}{b}=\frac{2b\times\sin 105°}{b}=2\times\sin 105° \Rightarrow \sin^2 105°=\frac{1-\cos 210°}{2}$

$=\frac{1+\frac{\sqrt3}{2}}{2}=\frac{2+\sqrt3}{4} \Rightarrow \sin 105°=\frac{\sqrt{2+\sqrt3}}{2}$

$\Rightarrow 2\times\sin 105°=\sqrt{2+\sqrt3}$

سؤال ۵)

$S_{ABE}=\frac12\times2\times4\times\sin B=4\sin B$

$S_{BCD}=\frac12\times3\times6\times\sin B=9\sin B$

$\Rightarrow \frac{S_{ABE}}{S_{BCD}}=\frac{4\sin B}{9\sin B}=\frac{4}{9}$

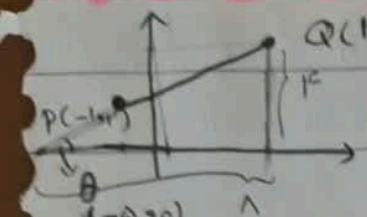
Date:

سؤال ۶

الف) $S = 2 \times \frac{1}{2} \times 3 \times 4 \times \sin 120^\circ = 12 \times \frac{\sqrt{3}}{2} = 6\sqrt{3}$ (مساحت مثلث)

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

سؤال ۷



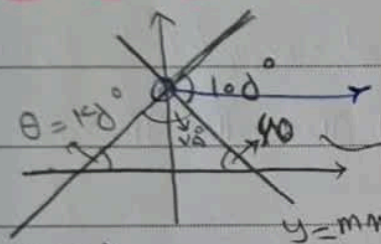
$a = \tan\theta = \text{شیب} = \frac{4-2}{3-(-1)} = \frac{1}{2}$

$y = \frac{1}{2}x + b \xrightarrow{x=3, y=4} 4 = \frac{3}{2} + b \Rightarrow b = \frac{5}{2}$

$\Rightarrow y = \frac{1}{2}x + \frac{5}{2} \xrightarrow{y=0} 0 = \frac{1}{2}x + \frac{5}{2} \Rightarrow x = -5 \Rightarrow \theta(-5,0)$

$\bar{u} = \sqrt{(8)^2 + (4)^2} = \sqrt{80} = 4\sqrt{5} \Rightarrow \cos\theta = \frac{\text{ضلع مجاور}}{\bar{u}} \Rightarrow \cos\theta = \frac{8}{4\sqrt{5}} = \frac{2\sqrt{5}}{5} = \frac{2}{\sqrt{5}}$

سؤال ۸



$y = b \\ y = \frac{5}{2} \Rightarrow b = \frac{5}{2}$

$\tan 60^\circ = m = \sqrt{3}$

$y = 2x + 5$

$\hookrightarrow y = x + \frac{5}{2} \rightarrow \text{شیب} = 1 = \tan 45^\circ \Rightarrow \theta = 45^\circ$

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

سؤال ۹

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

$f\left(\frac{5}{4}\pi\right) = \cot\frac{5\pi}{4} = \cot 225^\circ = -\sqrt{3}$

سؤال ۱۰

$$\frac{\sin\left(8\pi + \frac{\pi}{2} + x\right) + \cos\left(4\pi + \frac{3\pi}{2} - x\right)}{\cos(12\pi + \pi + x) - \sin(4\pi - x)} =$$

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