نام و نام خانوادگی امیرعباس عادلی ...... پاسخنامه تشریحی تکلیف شماره ۲۵ کلاس B - دهم ریاضی

1

الف) $(\sin 135° + \sin 300°)(\cos 315° - \cos 150°) = \left(\frac{\sqrt2-\sqrt3}{2}\right)\left(\frac{\sqrt2+\sqrt3}{2}\right) = \frac{2-3}{4} = \boxed{-\frac{1}{4}}$

$\underbrace{\frac{\sqrt2}{2} + \frac{-\sqrt3}{2}}_{\left(\frac{\sqrt2-\sqrt3}{2}\right)} \qquad \underbrace{\frac{+\sqrt2}{2} - \left(-\frac{\sqrt3}{2}\right)}_{\left(\frac{\sqrt2+\sqrt3}{2}\right)}$

ب) $\frac{1+3\tan^2 210°}{4\cos^2 330° + 2\cos^2 225°} = \frac{1+3\left(\frac{1}{\sqrt3}\right)^2}{4\left(\frac{\sqrt3}{2}\right)^2 + 2\left(\frac{\sqrt2}{2}\right)^2} = \frac{1+1}{3+1} = \frac{2}{4} = \boxed{\frac12}$

2

الف) $AH = BA \times \sin 45° = \sqrt6 \times \frac{\sqrt2}{2} = \sqrt3 \Rightarrow AH = \sqrt3$

$AC^2 = AH^2 + HC^2 \Rightarrow HC^2 = (2\sqrt3)^2 - (\sqrt3)^2 = 12 - 3 = 9 \Rightarrow HC = \sqrt9 = \boxed{3}$

ب) $\frac{HC}{AC} = \cos 30° \Rightarrow AC = \frac{9}{\frac{\sqrt3}{2}} = \frac{18}{\sqrt3} = 6\sqrt3 \Rightarrow AH = \underbrace{6\sqrt3}_{\text{وتر } AC} \times \sin 30° = \frac{6\sqrt3}{2} = 3\sqrt3$

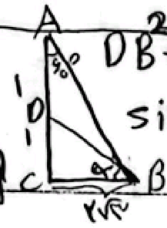
$\sin(B) = \frac{AH}{AB} = \frac{\cancel{3}\sqrt3}{\cancel{3}\sqrt6} = \frac{1}{\sqrt2} = \frac{\sqrt2}{2} \Rightarrow \boxed{\hat B = 45°}$

3

الف) $50\sqrt3 = \text{وتر} \times \sin 60° \Rightarrow AD = \frac{50\sqrt3}{\frac{\sqrt3}{2}} = 100 \Rightarrow \text{وتر} \times \cos 60° = BD \Rightarrow BD = \frac{100}{2} = 50$

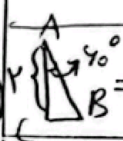
$AC \times \sin 30° = 50\sqrt3 \Rightarrow AC = \frac{50\sqrt3}{\frac12} = 100\sqrt3 \Rightarrow \underbrace{100\sqrt3}_{\text{وتر}} \times \underbrace{\cos 30°}_{\frac{\sqrt3}{2}} = BC \Rightarrow$

$BC = 150 = (50 + x) \Rightarrow \boxed{x = 100}$



$DB^2 = (2\sqrt3)^2 + (1)^2 = 13 \Rightarrow DB = \sqrt{13}$

$\sin\alpha = \frac{CD}{DB} = \boxed{\frac{1}{\sqrt{13}}} = \boxed{\frac{\sqrt{13}}{13}}$

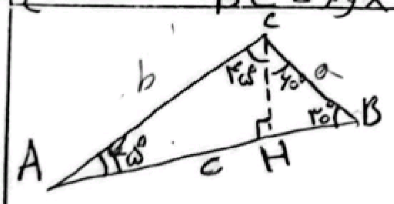
ب) 

$AB \times \cos 60° = 2 \Rightarrow \underbrace{AB}_{\text{وتر}} = \frac{2}{\frac12} = 4 \Rightarrow$

$BC = \text{وتر} \times \sin 60° = 4 \times \frac{\sqrt3}{2} = \boxed{2\sqrt3}$

4

$\boxed{\frac{AB}{AC} = \sqrt{2-\sqrt3}}$



$\frac{CB}{\sin 45°} = \frac{AC}{\sin(105°)} = \frac{AB}{\underbrace{\sin 30°}_{\frac12}} \Rightarrow 2AB = \frac{AC}{\sin(105°)} \Rightarrow$

$\left.\begin{array}{l} AB = c \\ CB = a \\ AC = b \end{array}\right\} \Rightarrow \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \Rightarrow$

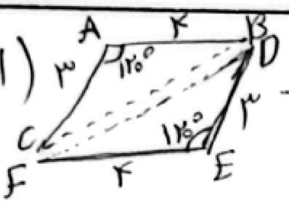
$\sin(105°) = \pm\sqrt{\frac{1-\cos 210°}{2}} = \sqrt{\frac{2+\sqrt3}{4}}$; $-\frac{\sqrt3}{2}$

$AB = \frac{AC}{2\sin(105°)} \Rightarrow \frac{AB}{AC} = \frac{\frac{AC}{2\sin(105°)}}{AC} = \frac{1}{2\sin(105°)}$

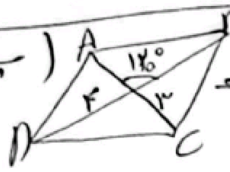
$\frac{AB}{AC} = \frac{1}{2\sin(105°)} = \frac{1}{\cancel{2}\times\frac{\sqrt{2+\sqrt3}}{\cancel{2}}} = \frac{1 \times \sqrt{2-\sqrt3}}{\sqrt{2+\sqrt3}\times\sqrt{2-\sqrt3}} = \frac{\sqrt{2-\sqrt3}}{\sqrt1} = \boxed{\sqrt{2-\sqrt3}}$

5

$\frac{S_{A\hat BE}}{S_{B\hat CD}} = \frac{\cancel{\frac12}\times AB \times BE \times \sin(B°)}{\cancel{\frac12}\times DB \times CB \times \sin(B°)} = \frac{\cancel{2}\times 4 \times \cancel{\sin(B°)}}{3\times\cancel{6}\times\cancel{\sin(B°)}} = \boxed{\frac{4}{9}}$

الف)  $\Rightarrow 2\times S_{\overset{\triangle}{ABC}} \Rightarrow S_{\overset{\triangle}{ABC}}=\frac{1}{2}\times4\times3\times\underbrace{\sin(120)^\circ}_{\frac{\sqrt{3}}{2}}=\frac{12\sqrt{3}}{4}\Rightarrow$

$S_{\text{متوازی الاضلاع}}=2\times\frac{\overset{6\sqrt3}{\cancel{12\sqrt{3}}}}{\underset{2}{\cancel{4}}}=\boxed{6\sqrt{3}}$ ۶

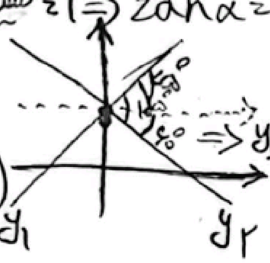
ب)  $\Rightarrow S_{ABCD}=\frac{1}{2}\times3\times4\times\sin(120^\circ)=\boxed{3\sqrt{3}}$

$\left.\begin{array}{l}Q=(3,4)\\ P=(-1,2)\end{array}\right\}\Rightarrow m=\frac{\Delta y}{\Delta x}=\frac{4-2}{3-(-1)}=\frac{2}{4}=\frac{1}{2}\Rightarrow$

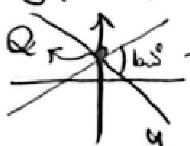
$\tan\theta=\frac{1}{2}\Rightarrow 1+\tan^2(\theta)=\frac{1}{\cos^2\theta}\Rightarrow 1+\frac{1}{4}=\frac{5}{4}=\frac{1}{\cos^2\theta}\Rightarrow$ ۷

$\cos^2\theta=\frac{4}{5}\Rightarrow\underset{\text{حاده}}{\cos\theta}=\cancel{\pm}\sqrt{\frac{4}{5}}=\sqrt{\frac{4}{5}}=\boxed{\frac{2}{\sqrt{5}}=\frac{2\sqrt{5}}{5}}$

$2y_1=2x+5\Rightarrow y_1=x+\frac{5}{2}\rightarrow y_1$ شیب خط $=1\Rightarrow\tan\alpha=1\Rightarrow\alpha=45^\circ\Rightarrow$



$y_2=mx+b$

 $\Rightarrow Q_1=(0,\frac{5}{2})\ ,\ Q_2=(0,b)$

$Q_1=Q_2\Rightarrow\boxed{b=\frac{5}{2}}$

$y_2=mx+b$

$\Downarrow$

$y_2=mx+\frac{5}{2}$

$\Rightarrow y_2$ شیب خط $=\tan(\underbrace{-60^\circ}_{-\tan(60^\circ)})=-\sqrt{3}\Rightarrow$ ۸

$m=-\sqrt{3}\Rightarrow$

$y_2=-\sqrt{3}x+\frac{5}{2}\Rightarrow$

$m\times b=-\sqrt{3}\times\frac{5}{2}=\boxed{\frac{-5\sqrt{3}}{2}}$

$F(x)=\cos(\pi+x)+\sin(\frac{\pi}{2}-x)-\tan(\frac{3\pi}{2}+x)\Rightarrow$

$F(x)=-\cos(x)+\cos(x)-(-\cot(x))=\cot(x)\Rightarrow$

$F(x)=\cot(x)\Rightarrow F(\frac{5\pi}{6})=\cot(\frac{5\pi}{6})=\cot(150^\circ)=\boxed{-\sqrt{3}}$

$\sin(\frac{17\pi}{2}+x)=\sin(\overbrace{\frac{16\pi}{2}}^{8\pi}+\frac{\pi}{2}+x)=\sin(\frac{\pi}{2}+x)=\cos(x)$

$\cos(\frac{15\pi}{2}-x)=\cos(\underbrace{\frac{14\pi}{2}}_{7\pi}+\frac{\pi}{2}-x)=-\cos(\frac{\pi}{2}-x)=-\sin(x)$

$\cos(3\pi+x)=-\cos(x)\ /\ \sin(6\pi-x)=\sin(x)$ ۱۰

$\Rightarrow\frac{\sin(\frac{17\pi}{2}+x)+\cos(\frac{15\pi}{2}-x)}{\cos(3\pi+x)-\sin(6\pi-x)}=\frac{\cos x-\sin x}{-\cos x-(-\sin x)}=\frac{\cancel{(\cos x-\sin x)}}{-\cancel{(\cos x-\sin x)}}$

$=\boxed{-1}$