فرهام علیوست تکلیف 20

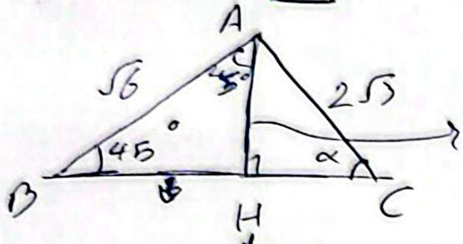
-1

الف) $(\underbrace{\sin 135}_{\frac{\sqrt2}{2}} + \underbrace{\sin 300}_{-\frac{\sqrt3}{2}})(\underbrace{\cos 315^\circ}_{\frac{\sqrt2}{2}} + \underbrace{\cos 150^\circ}_{-\frac{\sqrt3}{2}}) = (\frac{\sqrt2-\sqrt3}{2})(\frac{\sqrt2+\sqrt3}{2})$

$\Rightarrow \frac12(\sqrt2-\sqrt3)(\sqrt2+\sqrt3)\frac12 \Rightarrow \frac14(2-3) = -\frac14$

ب) $\frac{1+3\overbrace{\tan^2 210}^{\frac13}}{\underbrace{4\cos^2 330^\circ}_{\frac14}+\underbrace{2\cos^2 225^\circ}_{\frac12}} \Rightarrow \frac{2}{2} = 1$

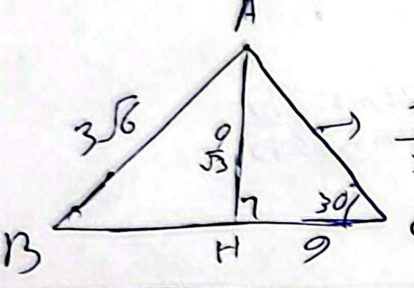
-2



الف) $HC = ?$

$\frac{\sqrt{12}}{2} = \frac{2\sqrt3}{2} = \sqrt3 \qquad \frac{\sqrt3}{2\sqrt3} = \frac12 = \sin\alpha \Rightarrow \alpha = 30^\circ$

$HC = \cos\alpha \times 2\sqrt3 \Rightarrow \frac{\sqrt3}{2}\times 2\sqrt3 = 3$

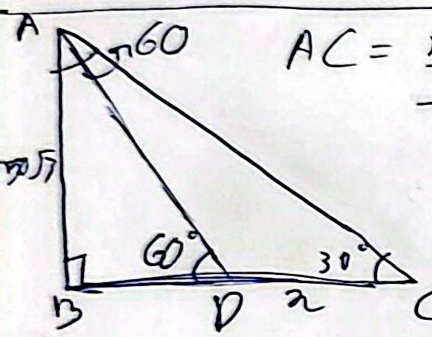


ب) $\hat B = ?$

$\frac{9}{\frac{1}{\frac{\sqrt3}{2}}} = \frac{18}{\sqrt3} \qquad AH = \frac{18}{\sqrt3}\times\frac12 = \frac{9}{\sqrt3}$

$\sin\hat B = \frac{\frac{9}{\sqrt3}}{\frac{3\sqrt6}{1}} = \frac{1}{\sqrt2} = \frac{\sqrt2}{2} \Rightarrow B = 45^\circ$

-3

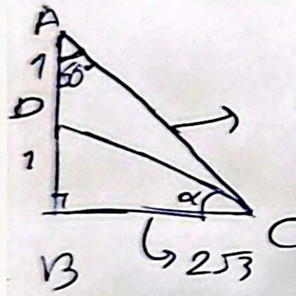


الف) $x = ?$

$AC = \frac{50\sqrt3}{\frac{1}{\frac12}} = 100\sqrt3 \qquad BC = \frac{100}{50}\sqrt3 \times \frac{\sqrt3}{2} = 150$

$AD = \frac{50\sqrt3}{\frac{1}{\frac{\sqrt3}{2}}} = 100 \Rightarrow BD = 100\times\frac12 = 50$

$x = 150 - 50 = 100$



ب) $\sin\alpha = ?$

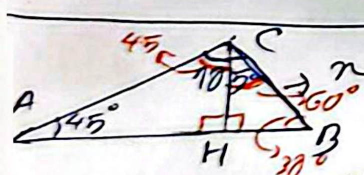
$AC = \frac{2}{\cos 60} = 4 \qquad \tan\alpha = \frac{1}{2\sqrt3} = \frac{\sqrt{12}}{12} = \frac{2\sqrt3}{12} = \frac{\sqrt3}{6}$

$BC = 2\sqrt3$

$1 + \cot^2\alpha = \frac{1}{\sin^2\alpha} \Rightarrow 1 + (\frac{6}{\sqrt3})^2 = \frac{1}{\sin^2\alpha} \Rightarrow 1 + \frac{36}{3} = \frac{1}{\sin^2\alpha}$

$13 = \frac{1}{\sin^2\alpha} \Rightarrow \sin^2\alpha = 13 \Rightarrow \sin\alpha = \sqrt{13}$

-4



$\frac{AB}{AC} = ?$

$CH = \frac{x}{2} \Rightarrow CA = \frac{\frac{x}{2}}{\frac{\sqrt2}{2}} = \frac{x}{\sqrt2} = \frac{\sqrt2 x}{2}$

$AH = \frac{x}{2} \qquad BH = \frac{\sqrt3}{2}x$

$AB = AH + BH = (\frac{1+\sqrt3}{2})x$

$\frac{AB}{AC} = \frac{(\frac{1+\sqrt3}{2})x}{(\frac{\sqrt2}{2})x} = \boxed{\frac{1+\sqrt3}{\sqrt2}}$

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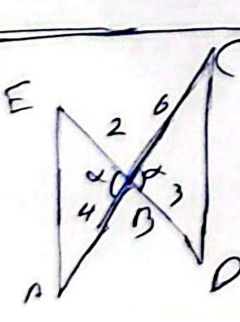


$\frac{S_{A\hat BE}}{S_{B\hat CD}} = ?$

$S_{A\hat BE} = \frac12 \times 2 \times 4 \times \sin\alpha$

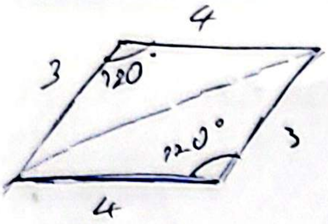
$\alpha = \alpha \Rightarrow$ متقابل به رأس

$S_{B\hat CD} = \frac12 \times 3 \times 6 \times \sin\alpha$

$\frac{S_{ABE}}{S_{BCD}} = \frac{\frac12 \times 2 \times 4 \times \sin\alpha}{\frac12 \times 3 \times 6 \times \sin\alpha} = \boxed{\frac49}$

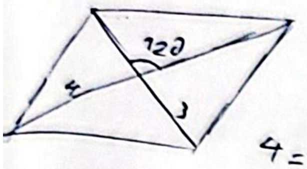
8- مساحت متوازی الاضلاع ؟

الف)



$\rightarrow S = \left(\frac{1}{2} \times \underbrace{\sin 120}_{\frac{\sqrt{3}}{2}} \times 3 \times 4\right) 2 = 6\sqrt{3}$

ب)



$S = \frac{1}{2} \times a b \sin\alpha = \frac{1}{2} \times 4 \times 3 \times \sin 120 = 3\sqrt{3}$

$4 = a \quad 3 = b$

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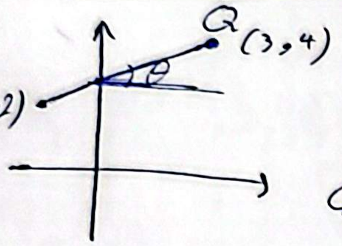

$\tan PQ = \frac{\Delta y}{\Delta x} = \frac{4-2}{3-(-1)} = \frac{2}{4} = \frac{1}{2}$

$1 + \tan^2\alpha = \frac{1}{\cos^2\alpha} \Rightarrow 1 + \frac{1}{4} = \frac{1}{\cos^2\alpha} \Rightarrow \frac{3}{4} = \frac{1}{\cos^2\alpha} \Rightarrow \cos^2\alpha = \frac{4}{3}$

$\cos\alpha = \frac{2}{\sqrt{3}}$

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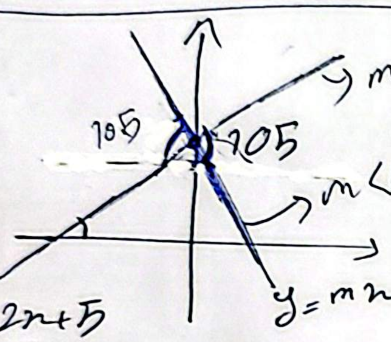
$mb = ?$



$y = 0 \Rightarrow \frac{2x+5}{2} = 0 \rightarrow \boxed{x = -\frac{5}{2}}$

$mx + \frac{5}{2} = 0 \Rightarrow mx = -\frac{5}{2}$

$m = -1$

$x = \frac{5}{2}$

$2y = 2x + 5$

$\hookrightarrow y = \frac{2x+5}{2} \rightarrow x + \frac{5}{2}$

$\hookrightarrow m = 1$

$y = mx + b \rightarrow \frac{5}{2}$

$y = \frac{0+5}{2} = b \Rightarrow b = \frac{5}{2}$

$mb = -1 \times \frac{5}{2} = -\frac{5}{2}$

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$f(x) = \cos(\pi + x) + \sin\left(\frac{\pi}{2} - x\right) \cdot \tan\left(\frac{3\pi}{2} + x\right) \Rightarrow -\left(\frac{1}{\sqrt{3}+1}\right) = \boxed{-\frac{1}{\sqrt{3}+1}}$

$180 \quad 0 \quad 90 \quad 270$

$f\left(\frac{5\pi}{6}\right) = ?$

$\hookrightarrow 150°$

$\cos(180 + 150) = -1 \times -\frac{\sqrt{3}}{2} - 0 \times \sin\beta = \frac{\sqrt{3}}{2}$

$\sin(90 - 150) = 1 \times -\frac{\sqrt{3}}{2} + \frac{1}{2} \times 0 = -\frac{\sqrt{3}}{2}$

$\xrightarrow{+} 0$

$\tan(270 + 150) = \frac{\frac{1}{\sqrt{3}}}{1 - (-\frac{1}{\sqrt{3}}) 1 + \frac{1}{\sqrt{3}}} = \frac{\frac{1}{\sqrt{3}}}{\frac{\sqrt{3}+1}{\sqrt{3}}} = \frac{1}{\sqrt{3}+1}$

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$\frac{\sin\left(\frac{17\pi}{2} + x\right) + \cos\left(\frac{15\pi}{2} + x\right)}{\cos(3\pi + x) - \sin(6\pi - x)} \Rightarrow \frac{\overset{+\cos x}{\sin(90 + x)} + \overset{+\sin x}{\cos(270 + x)}}{\underset{-\cos x}{\cos(3\pi + x)} - \underset{+\sin x}{\sin(6\pi - x)}} = \boxed{\frac{\cos x + \sin x}{-\cos x + \sin x}}$

$\frac{17\pi}{2} = 90°$

$\frac{15\pi}{2} = 270°$

$6\pi = 360$

$3\pi = 180$