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نام و نام خانوادگی ..... پاسخنامه تشریحی تکلیف شماره ... کلاس ...

۱ الف) $(\sin 45^\circ + \sin 150^\circ)(\cos 315^\circ - \cos 120^\circ) = (\frac{\sqrt{2}}{2} + (-\frac{\sqrt{3}}{2}))(\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2})$

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

ب) $\frac{1 + 2\tan^2 210^\circ}{4\cos^2 330^\circ + 2\cos^2 210^\circ} = \frac{1 + 2(-\frac{\sqrt{3}}{2})^2}{4(\frac{\sqrt{3}}{2})^2 + 2(-\frac{\sqrt{3}}{2})^2} = \frac{1 + 2(\frac{3}{4})}{4(\frac{3}{4}) + 2(\frac{3}{4})} = \frac{\frac{10}{4}}{\frac{18}{4}} = \frac{10}{18} = \frac{5}{9}$ ✓ (۲)

۲ الف) $\frac{c}{\sin C} = \frac{b}{\sin B} \rightarrow \frac{2\sqrt{3}}{\frac{\sqrt{3}}{2}} = \frac{\sqrt{6}}{x} \rightarrow x = \frac{\sqrt{6} \times \frac{\sqrt{3}}{2}}{2\sqrt{3}} = \frac{\frac{\sqrt{18}}{2}}{2\sqrt{3}} = \frac{\frac{3\sqrt{2}}{2}}{2\sqrt{3}} = \frac{3\sqrt{2}}{4\sqrt{3}} \times \frac{1}{\sqrt{3}} = \frac{1}{2}$ (۲)

$\Rightarrow C = 30^\circ$

$\Rightarrow HC = \frac{\sqrt{3}}{2} \times 2\sqrt{3} = 3$ ✓

ب) $AH = 4 \times \frac{\sqrt{3}}{2} = 2\sqrt{3}$ $\quad \frac{2\sqrt{6}}{1} = \frac{2\sqrt{3}}{x} \rightarrow x = \frac{2\sqrt{3}}{2\sqrt{6}} = \frac{\sqrt{3}}{\sqrt{6} \times \sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\sin \hat{B} = \frac{\sqrt{2}}{2} \Rightarrow \hat{B} = 45^\circ$ ✓

۳ الف) $\tan 45^\circ = \sqrt{1}$ ، $\tan 30^\circ = \frac{\sqrt{3}}{3}$ $\quad \tan 15^\circ = \frac{\sqrt{3}}{3} = \frac{50\sqrt{3}}{50 + x} = \frac{50\sqrt{3}}{BC}$

$\tan 15^\circ = \frac{50\sqrt{3}}{BD} = \sqrt{3} \Rightarrow BD = 50$

$\Rightarrow BC = \frac{50\sqrt{3} \times 2}{\sqrt{3}} = 100$ (۲)

$\Rightarrow \boxed{x = 100}$ ✓

ب) $\cos 45^\circ = \frac{1}{2} = \frac{2}{AC} \Rightarrow AC = 4$ $\quad \sin 45^\circ = \frac{\sqrt{2}}{2} = \frac{BC}{4}$ $\quad DC = \sqrt{3}$

$\Rightarrow BC = \frac{4 \times \sqrt{2}}{2} = 2\sqrt{2}$

$\frac{\sqrt{3}}{1} = \frac{1}{\sin \alpha}$

$\boxed{\frac{1}{\sqrt{3}}}$ ✓

۴ $\frac{AC}{\frac{1}{2}} = \frac{AB}{\sin 105^\circ}$ $\quad 105^\circ = 180^\circ - 75^\circ$ $\quad \sin 105^\circ = \sin(180^\circ - 75^\circ)$

$= \sin 180^\circ \cos 75^\circ - \sin 75^\circ \cos 180^\circ$ (۲)

$\Rightarrow \frac{1}{2} \times \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} \times -\frac{\sqrt{3}}{2} = \frac{\sqrt{2}}{4} - (-\frac{\sqrt{6}}{4})$

$\frac{AC}{AB} = \frac{\frac{1}{2}}{\frac{\sqrt{2} + \sqrt{6}}{4}} = \frac{\sqrt{2}}{2} + \frac{\sqrt{6}}{4} = \frac{\sqrt{2} + \sqrt{6}}{4}$ $\quad \frac{AC}{AB} = \frac{\frac{1}{4}}{\frac{\sqrt{2} + \sqrt{6}}{4}} = \frac{2}{\sqrt{2} + \sqrt{6}} \rightarrow \frac{AB}{AC} = \frac{\sqrt{2} + \sqrt{6}}{2}$ ✓

۵ $S_{BCD}^{\triangle} = \frac{1}{2} \times 6 \times 3 \times \sin \hat{B}_2 = 9 \sin \hat{B}_2$ $\quad \hat{B}_1 = \hat{B}_2$

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

$S_{ABE}^{\triangle} = \frac{1}{2} \times 4 \times 1 \times \sin \hat{B}_1 = 4 \sin \hat{B}_1$ (۲)

$\frac{S_{ABE}^{\triangle}}{S_{BCD}^{\triangle}} = \frac{4 \sin \hat{B}_1}{9 \sin \hat{B}_2} = \frac{4}{9}$ ✓

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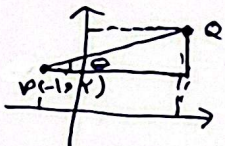
الف) $S = \frac{1}{2} \times 4 \times 3 \times \sin 120^\circ = \frac{1}{2} \times 12 \times \frac{\sqrt{3}}{2} = 3\sqrt{3}$

ب) $S = ab \sin\alpha = 3 \times 4 \times \frac{1}{2} = 6$

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

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



$\cos\theta = \frac{\text{مجاور}}{\text{وتر}} = \frac{|3-(-1)|}{\sqrt{|4-2|^2 + |3-(-1)|^2}} = \frac{4}{\sqrt{4+16}} = \frac{4}{\sqrt{20}}$ (2)

$1 + \tan^2\theta = \frac{1}{\cos^2\theta} \rightarrow 1 + \frac{1}{4} = \frac{1}{\cos^2\theta} \rightarrow \cos^2\theta = \frac{4}{5} \xrightarrow{\text{حاده } \theta} \cos\theta > 0 \rightarrow \cos\theta = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$ (7)

$m_{PQ} = \frac{4-2}{3-(-1)} = \frac{1}{2} \rightarrow \tan\theta$

$y = mx + b \quad -11 = 2x + 5 \quad 2y = 2x + 5 \quad b = 2.5$

$m = \tan 105^\circ = -(2+\sqrt{3}) = -2-\sqrt{3} \quad y = -x + 2.5$

$mb = 2.5(-2-\sqrt{3}) = -5 - 2.5\sqrt{3}$

$\tan 105^\circ = -(5 + 2.5\sqrt{3})$

(3) $\sin^2\alpha = \frac{1-\cos 2\alpha}{2} \rightarrow \frac{1-\cos 210}{2} = \frac{1-(-\frac{\sqrt{3}}{2})}{2} = \frac{\frac{2+\sqrt{3}}{2}}{2} = \frac{2+\sqrt{3}}{4} \Rightarrow \sin\alpha = \pm\frac{\sqrt{2+\sqrt{3}}}{2}$

$\cos^2\alpha = \frac{1+\cos 2\alpha}{2} \rightarrow \cos^2 105^\circ = \frac{1+\cos 210^\circ}{2} = \frac{1-\frac{\sqrt{3}}{2}}{2} = \frac{2-\sqrt{3}}{4} \Rightarrow \cos\alpha = \pm\frac{\sqrt{2-\sqrt{3}}}{2}$

$\frac{\sqrt{2+\sqrt{3}}}{-\sqrt{2-\sqrt{3}}} = \frac{\sqrt{2+\sqrt{3}}}{-\sqrt{2-\sqrt{3}}} = -2-\sqrt{3}$ (8)

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

$f(\frac{5\pi}{4}) = ? \quad -\cos x + \cos x - (-\cot x) = \cot x$

$f(\frac{5\pi}{4}) = \cot(\frac{5\pi}{4}) = \cot 180^\circ = -\sqrt{3}$ ✓ (9)

(4)

سوال ۵

$2y = 2x + 5 \rightarrow m = 1 \rightarrow \tan\theta = 1 \rightarrow \theta = 45^\circ \rightarrow y = mx + b \rightarrow m = \tan 120^\circ = -\sqrt{3}$

$(0, \frac{5}{2}) \rightarrow \frac{5}{2} = -\sqrt{3}(0) + b \rightarrow b = \frac{5}{2} \quad mb = \frac{5}{2} \times (-\sqrt{3}) = \frac{-5\sqrt{3}}{2}$

$$\frac{\sin(\frac{17\pi}{2} + x) + \cos(\frac{15\pi}{2} - x)}{\cos(2\pi + x) - \sin(4\pi - x)} = \frac{\sin(\frac{\pi}{2} + x) + \cos(\frac{3\pi}{2} - x)}{\cos(\pi + x) - \sin(2\pi - x)}$$

(5)

$\frac{17\pi}{2} = \frac{16\pi}{2} + \frac{\pi}{2} = 8\pi + \frac{\pi}{2}$

$\frac{15\pi}{2} = \frac{14\pi}{2} + \frac{\pi}{2} = 7\pi + \frac{\pi}{2}$

$= \frac{\cos x + (-\sin x)}{-\cos x - (-\sin x)} = \frac{\cos x - \sin x}{-\cos x + \sin x} = -\frac{\cos x - \sin x}{\cos x - \sin x}$

$= -1$ ✓ (10)