۱- الف) $\tan\frac{11\pi}{4} + \sin\frac{15\pi}{4}\cos\frac{13\pi}{4} \Rightarrow \tan(2\pi+\frac{3\pi}{4}) = \tan\frac{3\pi}{4} = -1$

$\sin\frac{15\pi}{4} = \sin(3\pi+\frac{3\pi}{4}) = -\sin\frac{3\pi}{4} = -\frac{\sqrt2}{2}$

$\cos\frac{13\pi}{4} = \cos(2\pi+\frac{5\pi}{4}) = \cos\frac{5\pi}{4} = -\frac{\sqrt2}{2}$

$\Rightarrow -1+(-\frac{\sqrt2}{2}\times-\frac{\sqrt2}{2}) = -1+\frac{2}{4} = \boxed{-\frac12}$

ب) $\tan\frac{17\pi}{6}\sin\frac{11\pi}{3}+\cos\frac{10\pi}{3} \Rightarrow \tan(2\pi+\frac{5\pi}{6}) = \tan\frac{5\pi}{6} = -\frac{\sqrt3}{3}$

$\sin\frac{11\pi}{3} = (3\pi+\frac{2\pi}{3}) = -\sin\frac{2\pi}{3} = -\frac{\sqrt3}{2}$

$\cos\frac{10\pi}{3} = (3\pi+\frac{\pi}{3}) = -\cos\frac{\pi}{3} = -\frac12$

$\Rightarrow (-\frac{\sqrt3}{3}\times-\frac{\sqrt3}{2}) - \frac12 = \frac{3}{6} - \frac12 = (0)$

۲- $\frac{3\cos\alpha-\sin\alpha}{\cos\alpha+\sin\alpha} \Rightarrow \frac{3\cot\alpha-1}{\cot\alpha+1} = \frac{3(4)-1}{4+1} = \frac{12-1}{5} = \boxed{\frac{11}{5}}$

۳- $\sin\alpha = 2\cos\alpha \longrightarrow \sin^2\alpha+\cos^2\alpha = 1 \longrightarrow 4\cos^2\alpha+\cos^2\alpha = 1$

$5\cos^2\alpha = 1 \longrightarrow \cos^2\alpha = \frac15$

$\cos\alpha = \left(-\frac{1}{\sqrt5}\right)$ یا $-\frac{\sqrt5}{5}$

۴-

$+\frac{7}{10}$

$-\frac{\sqrt2}{2}\times-\frac{\sqrt{98}}{10} - \frac{\sqrt2}{2}\times\frac{\sqrt2}{10}$

الف) $\cos(2\pi+\frac{3\pi}{4}+\alpha) = \cos\frac{3\pi}{4}\cos\alpha - \sin\frac{3\pi}{4}\sin\alpha = +\frac{7}{10} - \frac{1}{10} = \boxed{\frac{6}{10}}$

$\cos\alpha \longrightarrow \cos^2\alpha+\sin^2\alpha = 1 - \frac{2}{100} \longrightarrow \cos^2\alpha = \frac{98}{100} \longrightarrow \cos\alpha = -\frac{\sqrt{98}}{10}$

$-\frac{\sqrt2}{2}\times\frac{7\sqrt2}{10} + \frac{\sqrt2}{10}\times-\frac{\sqrt2}{2}$

ب) $\sin(2\pi+\frac{5\pi}{4}+\alpha) = \sin\frac{5\pi}{4}\cos\alpha + \sin\alpha\cos\frac{5\pi}{4} = -\frac{14}{20} - \frac{2}{20} = \frac{-16}{20} = \boxed{-\frac45}$

$1+\cot^2\alpha = \frac{1}{\sin^2\alpha} \longrightarrow 1+49 = \frac{1}{\sin^2\alpha} \longrightarrow 50\sin^2\alpha = 1 \longrightarrow \sin^2\alpha = \frac{1}{50} \longrightarrow \sin\alpha = \frac{1}{\sqrt{50}}\times\frac{\sqrt{50}}{\sqrt{50}} = \frac{5\sqrt2}{50} = \frac{\sqrt2}{10}$

$\cos\alpha = \frac{7}{\frac{10}{\sqrt2}} \longleftarrow \frac{10\cos\alpha}{\sqrt2} = 7 \longleftarrow \frac{\cos\alpha}{\frac{\sqrt2}{10}} = 7$

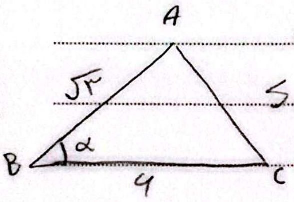
$\cos\alpha = \frac{7\sqrt2}{10}$

۵- $2\sin^2x+\cos^2x = \frac43 \longrightarrow \sin^2x + \underbrace{\sin^2x+\cos^2x}_{1} = \frac43$

$\sin^2x = \frac43 - 1 \longrightarrow \sin^2x = \frac13$

$\cos^2x+\sin^2x = 1 \longrightarrow \cos^2x = 1-\frac13 \longrightarrow \cos^2x = \frac23$ $\quad \tan^2x = \frac{\frac13}{\frac23} = \frac36 = \left(\frac12\right)$

۶-



مساحت = ۴/۵

$S = \frac12(\sqrt3)(6)\times\sin\alpha = 3\sqrt3\times\sin\alpha = 4.5 \longrightarrow \sin\alpha = \frac{4.5}{3\sqrt3}$

$\sin\alpha = \frac{4.5\times\sqrt3}{9} = \frac{\sqrt3}{2}$

$\alpha = 120^\circ, 60^\circ$

$\frac{120}{60} = (2)$

ماینالین الرجایا

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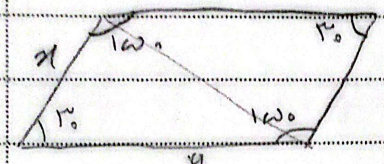


$S = \frac{1}{2} y \times y \times \sin 30 = \frac{1}{4} y^2$ ۷

$\frac{1}{4} y^2 = 36 \rightarrow y^2 = 144 \rightarrow y = +\sqrt{144}$

$\frac{x}{y} = \frac{3}{4} \rightarrow x = \frac{3}{4} y$

$65 = \sqrt{144} + \sqrt{144} + \frac{3}{4}\sqrt{144} + \frac{3}{4}\sqrt{144} = 2\sqrt{144} + \frac{6}{4}\sqrt{144}$

$10\sqrt{13} \leftarrow \frac{10}{3}\sqrt{144}$

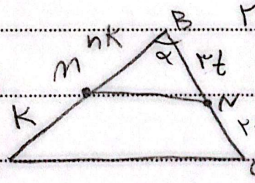
$S_{ABC} = \sin A \times 8 \times 7 \times \frac{1}{2} = 28 \sin A$ ۸

$S_{ADE} = \sin A \times 7 \times 24 \times \frac{1}{2} = 84 \sin A$

$\frac{28}{2}\sin A - 84 \sin A = 70$

$28 \sin A - 84 \sin A = 70 \rightarrow \sin A = 0.5 = \frac{1}{2}$

$A = 30^\circ \quad \tan 30^\circ = \frac{\sqrt{3}}{3}$



$2BN = 2NC \rightarrow BN = \frac{2}{2}(NC) \rightarrow 2t = BN$ ۹

$S_{ABC} = 2 S_{BMN} \rightarrow 8t \times \frac{1}{2} \times \sin\alpha \times (n+1)K = 2 \times \frac{1}{2} \times \sin\alpha \times nK \times 2t$

$8K + 8nK = 9nK$

$\frac{BM}{AM} = \frac{nK}{K} = n = \frac{8}{4}$

$8K = 4nK \rightarrow n = \frac{8K}{4K}$

۱۰

$\frac{1}{\sqrt{\cos^2\alpha}} - \tan\alpha = \frac{1+\sin\alpha}{|\cos\alpha|} \rightarrow \frac{1}{|\cos\alpha|} + \frac{-1-\sin\alpha}{|\cos\alpha|} = \frac{\sin\alpha}{\cos\alpha} \Rightarrow -\cos\alpha = |\cos\alpha|$

$\cos\alpha < 0$

$\frac{|\sin\alpha|}{\cos\alpha} = -\frac{1}{\cot\alpha} \rightarrow \frac{|\sin\alpha|}{\cos\alpha} = -\frac{\sin\alpha}{\cos\alpha} \Rightarrow |\sin\alpha| = -\sin\alpha \Rightarrow \sin\alpha < 0$

ناصر سوم