پایان ریاضی

۱) $\tan\frac{3\pi}{4} + \sin\frac{7\pi}{4}\cos\frac{5\pi}{4} = -1 + \frac{-\sqrt{2}}{2} \times \frac{-\sqrt{2}}{2} = -1 + \frac{1}{2} = \boxed{-\frac{1}{2}}$

$\tan\frac{5\pi}{6}\ \sin\frac{5\pi}{6} + \cos\frac{4\pi}{3} = -\sqrt{3} \times \left(-\frac{\sqrt{3}}{2}\right) + \left(-\frac{1}{2}\right) = \frac{3}{2} - \frac{1}{2} = \boxed{1}$

۲) $\frac{\cancel{\sin x}\,(2\cot x - 1)}{\cancel{\sin x}\,(\cot x + 1)} = \frac{12 - 1}{4 + 1} = \boxed{\frac{11}{5}}$

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۳) $\sin^2\alpha + \cos^2\alpha = 1 \qquad (2\cos\alpha)^2 + \cos^2\alpha = 1$

$5\cos^2\alpha = 1 \Rightarrow \cos^2\alpha = \frac{1}{5} \qquad \cos\alpha = -\frac{1}{\sqrt{5}} = \boxed{-\frac{\sqrt{5}}{5}}$

در ناحیه‌ی سوم

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۴) $\sin\alpha = \frac{\sqrt{2}}{10} \qquad \cos\alpha = -\frac{7\sqrt{2}}{10}$

$\cos\left(\frac{3\pi}{4} + \alpha\right) = \frac{-7\sqrt{2}}{10} \times -\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{10} \times \frac{\sqrt{2}}{2} = \frac{14}{20} - \frac{2}{20} = \frac{12}{20} = \boxed{\frac{6}{10}}$

$7\sin\alpha = \cos\alpha \qquad \sin^2\alpha + 49\sin^2\alpha = 1 \qquad 50\sin^2\alpha = 1 \qquad \sin\alpha = \frac{\sqrt{50}}{50} = \frac{5\sqrt{2}}{50} = \frac{\sqrt{2}}{10}$

$\cos\alpha = \frac{7\sqrt{2}}{10} \qquad \sin\left(\frac{5\pi}{4} + \alpha\right) = -\frac{\sqrt{2}}{2} \times \frac{7\sqrt{2}}{10} + \frac{\sqrt{2}}{10} \times \frac{-\sqrt{2}}{2} = -\frac{7}{10} + -\frac{1}{10}$

$= \boxed{-\frac{8}{10}}$

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۵) $\sin^2 x + \cancel{\sin^2 x + \cos^2 x} = \cancel{1} + \frac{1}{3} \Rightarrow \sin^2 x = \frac{1}{3} \Rightarrow \sin x = \pm\frac{\sqrt{3}}{3}$

$\cos x = \pm\frac{\sqrt{6}}{9} \qquad \tan x = \pm\frac{\frac{\sqrt{3}}{\cancel{3}}}{\frac{\sqrt{6}}{\cancel{9}\,3}} = \pm\frac{3\sqrt{3}}{\sqrt{6}} = \pm\frac{\cancel{3}\sqrt{18}}{\cancel{6}\,2} = \boxed{\pm\frac{3\sqrt{2}}{2}}$

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۶) $\frac{6\sin\alpha \times \sqrt{3}}{2} = \frac{9}{2} \qquad 6\sin\alpha = 3\sqrt{3} \qquad \sin\alpha = \frac{\sqrt{3}}{2}$

$\alpha = \begin{cases} 60 \\ 120 \end{cases} \qquad \frac{120}{60} = \boxed{2}$

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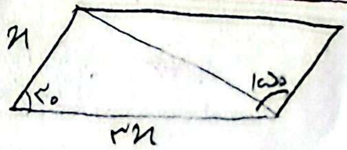
۷) $S = \cancel{2}\left(\frac{6x^2 \cdot \frac{1}{2}}{\cancel{2}}\right) = 9$

$\frac{x^2}{2} = 9 \qquad x^2 = 18 \qquad x = 3\sqrt{2}$



$P = 2(6\sqrt{2} + 9\sqrt{2}) = \boxed{30\sqrt{2}}$

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$$\frac{S(\hat{ABC})}{S(\hat{ADE})} = \frac{\frac{\omega \times \nu \sin\hat{A}}{\nu}}{\frac{\varepsilon \times \nu \sin\hat{A}}{\nu}} = \frac{\omega}{\varepsilon}$$

$S(\hat{ABC}) = \omega x$

$S(\hat{AED}) = \varepsilon x$

$\omega x - \varepsilon x = 1,\nu\omega$

$x = 1,\nu\omega$

$S(\hat{ADE}) = \varepsilon \times 1,\nu\omega = \nu$

$$\frac{\omega \times \nu \sin\alpha}{\nu} = \nu$$

$$\omega \sin\alpha = \nu$$

$$\sin\alpha = \frac{\nu}{\omega} \quad \cos\alpha = \frac{\sqrt{\nu 1}}{\omega} \quad \tan\alpha = \frac{\frac{\nu}{\omega}}{\frac{\sqrt{\nu 1}}{\omega}} = \frac{\nu}{\sqrt{\nu 1}} = \boxed{\frac{\nu\sqrt{\nu 1}}{\nu 1}}$$

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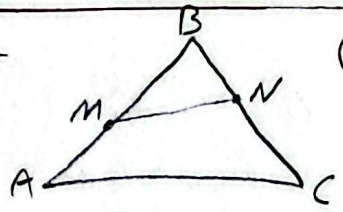

$$\frac{S(\hat{BMN})}{S(\hat{ABC})} = \frac{\frac{\nu \times MB \times \sin\hat{B}}{\nu}}{\frac{\omega \times AB \times \sin\hat{B}}{\nu}} = \frac{1}{\nu} \Rightarrow \frac{\nu}{\omega} \times \frac{MB}{AB} = \frac{1}{\nu}$$

$$\Rightarrow \frac{MB}{AB} = \frac{\omega}{9} \Rightarrow \frac{MB}{AM} = \boxed{\frac{\omega}{\varepsilon}}$$

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$$\frac{|\sin\alpha|}{\cos\alpha} = -\frac{\sin\alpha}{\cos\alpha} \Rightarrow \boxed{\sin < 0}$$

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

$$\Downarrow$$

$$-\frac{\sin\alpha}{\cos\alpha} = \frac{\sin\alpha}{|\cos\alpha|} \Rightarrow |\cos\alpha| = -\cos\alpha$$

$$\Downarrow$$

$$\boxed{\cos\alpha < 0}$$

ناحیه‌ی سوم