

$$\text{الف) } \tan \frac{11\pi}{6} + \sin \frac{12\pi}{6} \cos \frac{13\pi}{6} = \frac{1\pi + 3\pi}{6} + \frac{12\pi - \pi}{6} \times \frac{12\pi + \pi}{6} =$$

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

$$\text{ب) } \tan \frac{14\pi}{6} \sin \frac{11\pi}{6} + \cos \frac{10\pi}{6} = \tan \frac{7\pi}{3} \sin(-\frac{\pi}{6}) + \cos \frac{5\pi}{3} =$$

$$(-\frac{\sqrt{3}}{2}) \times (-\frac{\sqrt{3}}{2}) + (-\frac{1}{2}) = \frac{3}{4} - \frac{1}{2} = 0$$

$$\cot x = \frac{\cos x}{\sin x} = \frac{1}{2} \rightarrow \cos x = \frac{1}{2} \sin x$$

$$\frac{2(\frac{1}{2} \sin x) - \sin x}{\frac{1}{2} \sin x + \sin x} = \frac{1\sin x - \sin x}{\frac{3}{2} \sin x} = \frac{0}{\frac{3}{2} \sin x} = 0$$

$$\sin^2 \alpha + \cos^2 \alpha = 1 \quad \sin \alpha = \frac{1}{\sqrt{2}} \rightarrow (\frac{1}{\sqrt{2}})^2 + \cos^2 \alpha = 1 \rightarrow \cos^2 \alpha = \frac{1}{2}$$

$$\cos^2 \alpha = \frac{1}{2} \rightarrow \cos \alpha = \pm \frac{1}{\sqrt{2}} \quad \text{بسیار} \rightarrow \cos \alpha = -\frac{1}{\sqrt{2}}$$

$$\text{الف) } \cos(\frac{11\pi}{6} + \alpha) = \cos(\frac{3\pi}{2} + \alpha) \quad \cos \frac{3\pi}{2} = -\frac{\sqrt{2}}{2} \quad \sin \frac{3\pi}{2} = \frac{\sqrt{2}}{2} \quad \sin \alpha = \frac{\sqrt{2}}{10}$$

$$\cos^2 \alpha = 1 - (\frac{\sqrt{2}}{10})^2 = 1 - \frac{2}{100} = 1 - \frac{1}{50} = \frac{49}{50} \quad \cos \alpha = \pm \frac{7}{\sqrt{50}} = \pm \frac{7\sqrt{2}}{10} \quad \text{بسیار} \rightarrow -\frac{7\sqrt{2}}{10}$$

$$\cos(\frac{3\pi}{2} + \alpha) = (-\frac{\sqrt{2}}{2})(-\frac{7\sqrt{2}}{10}) - (\frac{\sqrt{2}}{2})(\frac{\sqrt{2}}{10}) = \frac{7 \times 2}{20} - \frac{2}{20} = \frac{14-2}{20} = \frac{12}{20} = \frac{3}{5}$$

$$\text{ب) } \frac{11\pi}{6} + \alpha \rightarrow \frac{3\pi}{2} + \frac{3\pi}{2} + \alpha \rightarrow \cos(\frac{3\pi}{2} + \alpha) = -\sin \alpha$$

$$\sin \alpha = \frac{\sqrt{2}}{10} \quad \cos(\frac{11\pi}{6} + \alpha) = -\frac{\sqrt{2}}{10}$$

$$\text{ب) } \tan \alpha + 1 = \frac{1}{\cos^2 \alpha} \quad 1 + \frac{1}{16} = \frac{1}{\cos^2 \alpha} \quad \cos \alpha = \frac{4}{5} - \frac{4\sqrt{2}}{10}$$

$$\sin(\frac{5\pi}{6} + \alpha) = (-\frac{\sqrt{3}}{2}) \cos \alpha + (-\frac{1}{2}) \sin \alpha = -\frac{\sqrt{3}}{2} (\sin \alpha + \cos \alpha) = -\frac{1}{2}$$

$$\cos^2 x + 2 \sin^2 x = \frac{5}{4} \quad \sin^2 x + \cos^2 x = 1 \quad (1 - \sin^2 x) + 2 \sin^2 x = \frac{5}{4}$$

$$1 + \sin^2 x = \frac{5}{4} \quad \sin^2 x = \frac{5}{4} - 1 = \frac{1}{4}$$

$$\rightarrow \cos^2 x = 1 - \sin^2 x = 1 - \frac{1}{4} = \frac{3}{4}$$

$$\rightarrow \tan^2 x = \frac{\sin^2 x}{\cos^2 x} = \frac{\frac{1}{4}}{\frac{3}{4}} = \frac{1}{3} = \frac{1}{3}$$

$$S_{\triangle ABC} = \frac{1}{2} \times \sqrt{2} \times 4 \times \sin \alpha = 2\sqrt{2} \rightarrow \sin \alpha = \frac{\sqrt{2}}{2} \begin{cases} 45^\circ \checkmark \\ 135^\circ \checkmark \\ 225^\circ \times \\ 315^\circ \times \end{cases}$$

$$\frac{12}{-4} = 2$$

$$\left. \begin{array}{l} \text{منبع اول} = 2K \\ \text{منبع دو} = 2K \\ \text{منبع س} = a \times b \times \sin \theta \end{array} \right\} 2K \times 2K \times \frac{\sin 120^\circ}{\frac{1}{2}} = 24 \rightarrow 4K^2 \times \frac{1}{2} = 24$$

$$2K^2 = 24$$

$$K^2 = 12$$

$$K = \sqrt{12} = 2\sqrt{3}$$

$$\rightarrow \text{منبع اول} = 2K = 2 \times 2\sqrt{3} = 4\sqrt{3}$$

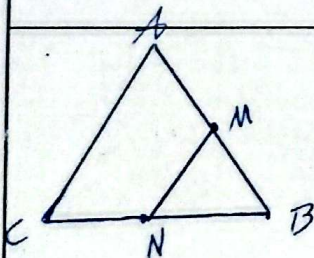
$$\text{منبع دو} = 2K = 2 \times 2\sqrt{3} = 4\sqrt{3}$$

$$\text{منبع س} \rightarrow 2(a+b) = 2(4\sqrt{3} + 4\sqrt{3}) = 16\sqrt{3}$$

$$\triangle ABC > \triangle ADE \rightarrow \frac{1}{2} \times 4 \times 2 \times \sin \hat{A} - \frac{1}{2} \times 4 \times 2 \times \sin \hat{A} = \frac{2 \times 2 \times \sin \hat{A}}{2} - \frac{2 \times 2 \times \sin \hat{A}}{2} = 1, \sqrt{2}$$

$$\frac{4 \sin \hat{A}}{2} = 1, \sqrt{2} \rightarrow 4 \sin \hat{A} = 2, \sqrt{2} \rightarrow \sin \hat{A} = \frac{1}{\sqrt{2}} \rightarrow \begin{cases} 45^\circ \checkmark \\ 135^\circ \times \end{cases}$$

$$\tan 45^\circ = \frac{1}{1}$$



$$\overline{NC} = \frac{2}{3} \overline{BN} \rightarrow \overline{BC} = \frac{5}{3} \overline{BN} \quad \overline{AM} + \overline{MB} = \overline{AB}$$

$$\frac{\frac{1}{2} \times \overline{AB} \times \overline{BC} \times \sin \hat{B}}{\frac{1}{2} \times \overline{MB} \times \overline{BN} \times \sin \hat{B}} = 3 \rightarrow \frac{\overline{AB}}{\overline{MB}} = \frac{9}{2}$$

$$\rightarrow 2AM + 2BM = 9BM$$

$$2AM = 7BM$$

$$\frac{BM}{AM} = \frac{2}{7}$$

$$\frac{|\sin \alpha|}{\cos \alpha} = \frac{-1}{\frac{\cos \alpha}{\sin \alpha}} \rightarrow \frac{|\sin \alpha|}{\cos \alpha} = -\frac{\sin \alpha}{\cos \alpha} \rightarrow \sin \alpha \Rightarrow (-)$$

$$\frac{1}{|\cos \alpha|} - \frac{\sin \alpha}{\cos \alpha} = \frac{1 + \sin \alpha}{|\cos \alpha|} \times |\cos \alpha| \rightarrow -1 - \frac{\sin \alpha \times |\cos \alpha|}{\cos \alpha} = 1 + \sin \alpha$$

$$\rightarrow \frac{|\cos \alpha|}{\cos \alpha} \times \sin \alpha = \sin \alpha \rightarrow \cos \ominus \rightarrow \text{حل}$$