

$$1) \tan\left(2\pi + \frac{3\pi}{4}\right) + \sin\left(3\pi + \frac{3\pi}{4}\right) \times \cos\left(3\pi + \frac{\pi}{4}\right) \Rightarrow \tan \frac{3\pi}{4} + \sin \frac{3\pi}{4} \times \cos \frac{\pi}{4}$$

$$\Rightarrow -1 + \left(\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2}\right) = -1 + \frac{1}{2} = \boxed{-\frac{1}{2}}$$

$$2) \tan\left(2\pi + \frac{5\pi}{4}\right) \times \sin\left(3\pi + \frac{3\pi}{4}\right) + \cos\left(3\pi + \frac{\pi}{4}\right) \Rightarrow \tan \frac{5\pi}{4} \times \sin \frac{3\pi}{4} + \cos \frac{\pi}{4}$$

$$\Rightarrow \left(\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2}\right) + \frac{1}{2} = \frac{1}{2} + \frac{1}{2} = \boxed{1}$$

$$\frac{3\cos\alpha - \sin\alpha}{\cos\alpha + \sin\alpha} \rightarrow \cos\alpha = k, \sin\alpha = k$$

$$\rightarrow \frac{3k - k}{k + k} = \boxed{\frac{1}{2}}$$

$$\sin^2\alpha + \cos^2\alpha = 1 \xrightarrow{\sin\alpha = 2\cos\alpha} (2\cos\alpha)^2 + \cos^2\alpha = 1 \Rightarrow 4\cos^2\alpha + \cos^2\alpha = 1 \Rightarrow 5\cos^2\alpha = 1 \Rightarrow \cos^2\alpha = \frac{1}{5}$$

$$\cos\alpha = \boxed{\frac{\sqrt{5}}{5}}$$

در جواب سوال
 $\cos\alpha = \frac{1}{\sqrt{5}}$

$$1) \cos^2\alpha = 1 - \sin^2\alpha \Rightarrow \cos^2\alpha = \frac{1}{5} - \frac{4}{5} = -\frac{3}{5} \Rightarrow \cos\alpha = \frac{\sqrt{3}}{5}$$

$$\cos\left(\frac{11\pi}{6} + \alpha\right) = \left(\cos \frac{11\pi}{6} \times \cos\alpha\right) - \left(\sin \frac{11\pi}{6} \times \sin\alpha\right) = \left(\frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{5}\right) - \left(\frac{1}{2} \times \frac{2}{5}\right)$$

$$= \frac{\sqrt{3}}{10} - \frac{1}{5} = \frac{\sqrt{3} - 2}{10}$$

$$2) 1 + \tan\alpha = \frac{1}{\cos\alpha} \Rightarrow \frac{1}{\cos\alpha} + \frac{1}{\cos\alpha} = \frac{1}{\cos\alpha} \Rightarrow \cos\alpha = \frac{1}{2}, \sin^2\alpha = 1 - \cos^2\alpha = 1 - \frac{1}{4} = \frac{3}{4} \Rightarrow \sin\alpha = \frac{\sqrt{3}}{2}$$

$$\sin\left(\frac{13\pi}{6} + \alpha\right) = \left(\sin \frac{13\pi}{6} \times \cos\alpha\right) + \left(\cos \frac{13\pi}{6} \times \sin\alpha\right) = \left(-\frac{\sqrt{3}}{2} \times \frac{1}{2}\right) + \left(\frac{1}{2} \times \frac{\sqrt{3}}{2}\right)$$

$$= -\frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{4} = \boxed{0}$$

$$\sin^2\alpha + \cos^2\alpha + \sin^2\alpha = \frac{4}{5} \Rightarrow \sin^2\alpha = \frac{1}{5} \Rightarrow \cos^2\alpha = 1 - \sin^2\alpha = \frac{4}{5}$$

$$\tan^2\alpha = \frac{\sin^2\alpha}{\cos^2\alpha} = \frac{\frac{1}{5}}{\frac{4}{5}} = \boxed{\frac{1}{4}}$$

$$\frac{1}{x} \times \frac{r}{\sqrt{r}} \times \sin \alpha = \frac{1}{2} \rightarrow \sin \alpha = \frac{\frac{r}{\sqrt{r}}}{\frac{r}{\sqrt{r}}} = \frac{r}{\sqrt{r}} \times \frac{\sqrt{r}}{\sqrt{r}} = \frac{\sqrt{r}}{\sqrt{r}}$$

$$\rightarrow \alpha_{\max} = 45^\circ, \alpha_{\min} = 45^\circ \rightarrow \frac{12}{4} = \boxed{3}$$

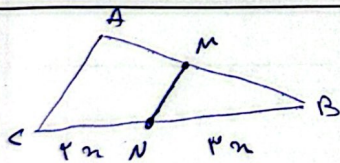
$$r \times \frac{1}{x} \times r \times \frac{1}{x} \times \frac{1}{x} = \frac{1}{2} \rightarrow r \times \frac{1}{x} = \frac{1}{2} \rightarrow r = \frac{1}{2} \times x \rightarrow r = \frac{\sqrt{r}}{\sqrt{r}}$$

$$P = r \left(\frac{r(\sqrt{r})}{1\sqrt{r}} + \frac{r(\sqrt{r})}{1\sqrt{r}} \right) = \boxed{3\sqrt{r}}$$

$$S_1 = S_{\triangle ABC} = \frac{1}{2} \times AB \times AC \times \sin \hat{A} = \frac{1}{2} \times 2 \times \sqrt{2} \times \sin \hat{A} = \frac{\sqrt{2}}{2} \sin \hat{A}$$

$$S_2 = S_{\triangle ADE} = \frac{1}{2} \times AD \times AE \times \sin \hat{A} = \frac{1}{2} \times \sqrt{2} \times \sqrt{2} \times \sin \hat{A} = \frac{\sqrt{2}}{2} \sin \hat{A}$$

$$S_1 - S_2 = 1, \sqrt{2} \rightarrow \frac{\sqrt{2}}{2} \sin \hat{A} = \frac{\sqrt{2}}{2} \rightarrow \sin \hat{A} = \frac{1}{\sqrt{2}} \rightarrow \hat{A} = 45^\circ \rightarrow \tan \alpha = \boxed{\frac{\sqrt{2}}{2}}$$



$$rBN = rNC \rightarrow BN = \frac{r}{2} NC$$

$$\frac{S_{\triangle ABC}}{S_{\triangle BNM}} = 2 \rightarrow \frac{\frac{1}{2} \times AB \times \sqrt{2} \times \sin \hat{A}}{\frac{1}{2} \times BM \times \sqrt{2} \times \sin \hat{A}} = 2$$

$$\rightarrow \frac{AB}{BM} = \frac{2}{1} \rightarrow AB = 2BM \rightarrow \frac{BM}{AM} = \boxed{\frac{1}{2}}$$

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

$$\rightarrow \cos \alpha < 0 \rightarrow \alpha \text{ در ناحیه دوم یا سوم}$$

$$\frac{|\sin \alpha|}{\cos \alpha} = \frac{-1}{\cos \alpha} \rightarrow \frac{|\sin \alpha|}{\cos \alpha} = \frac{-\sin \alpha}{\cos \alpha} \rightarrow |\sin \alpha| = -\sin \alpha \rightarrow \alpha \text{ در ناحیه دوم یا سوم}$$

$$\Rightarrow \alpha \text{ در ناحیه سوم قرار دارد}$$