



۱۹،۵

همدختی

تکلیف ۱۸

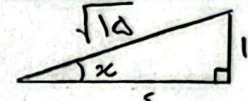
سایه‌ارادی

$$(الف) \tan \frac{11\pi}{8} + \sin \frac{15\pi}{8} \cos \frac{13\pi}{8} = \tan(135^\circ) + (\sin(315^\circ) \times \cos(225^\circ)) = -1 + \frac{2}{8} = \boxed{-\frac{1}{4}} \quad (1)$$

$$(ب) \tan \frac{11\pi}{4} \sin \frac{11\pi}{4} + \cos \frac{10\pi}{4} = (\tan(135^\circ) \times \sin(300^\circ)) + \cos(225^\circ) = \frac{2}{4} - \frac{1}{4} = \frac{1}{4} - \frac{1}{4} = \boxed{0}$$

$$\cot x = 2$$

$$\frac{2 \cos x - \sin x}{\cos x + \sin x} = \frac{2(\frac{2}{\sqrt{15}}) - \frac{1}{\sqrt{15}}}{\frac{2}{\sqrt{15}} + \frac{1}{\sqrt{15}}} = \frac{\frac{4-1}{\sqrt{15}}}{\frac{3}{\sqrt{15}}} = \boxed{\frac{11}{5}}$$



$$\sin \alpha = 2 \cos \alpha$$

$$\sin -$$

$$\cos -$$

$$110^\circ < \alpha < 270^\circ$$

$$-1 < \sin \alpha < 0$$

$$-1 < \cos \alpha < 0$$

$$\sin^2 + \cos^2 = 1$$

$$\Rightarrow (2 \cos)^2 + \cos^2 = 1$$

$$\Rightarrow 4 \cos^2 + \cos^2 = 1$$

$$\Rightarrow 5 \cos^2 = 1$$

$$\Rightarrow \cos^2 = \frac{1}{5}$$

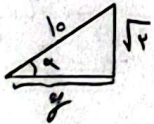
$$\Rightarrow \cos = \boxed{-\frac{1}{\sqrt{5}}}$$

$$(الف) \frac{\sin \alpha + \cos \alpha}{\sin \alpha} = \frac{\sqrt{5}}{10}$$

$$\sin \alpha = \frac{\sqrt{5}}{10}$$

$$\cos(\frac{11\pi}{8} + \alpha) = \cos(\frac{3\pi}{8} + \alpha) = \cos(\frac{3\pi}{8}) \cos \alpha - \sin(\frac{3\pi}{8}) \sin \alpha$$

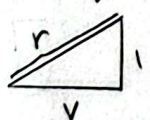
$$\Rightarrow (-\frac{\sqrt{2}}{4} \times \frac{\sqrt{5}}{10}) - (\frac{\sqrt{2}}{4} \times \frac{\sqrt{5}}{10}) = \frac{-1\sqrt{5}}{40} - \frac{1\sqrt{5}}{40} = \frac{-2\sqrt{5}}{40} = \boxed{-\frac{\sqrt{5}}{20}}$$



$$y = 100 - 2 = 98 \rightarrow \sqrt{98} = 7\sqrt{2}$$

$$(ب) \frac{\sin \alpha + \cos \alpha}{\tan \alpha} = \frac{1}{\sqrt{5}}$$

$$\tan \alpha = \frac{1}{\sqrt{5}}$$



$$r = 29 + 1 = 30 \rightarrow \sqrt{30} = 3\sqrt{10}$$

$$\sin(\frac{13\pi}{8} + \alpha) = \sin(\frac{5\pi}{8} + \alpha) = \sin(\frac{5\pi}{8}) \cos \alpha + \sin \alpha \cos(\frac{5\pi}{8})$$

$$\Rightarrow (\frac{-\sqrt{2}}{4} \times \frac{1}{\sqrt{5}}) + (\frac{1}{\sqrt{5}} \times \frac{\sqrt{2}}{4}) = \frac{-\sqrt{2}}{4\sqrt{5}} + \frac{\sqrt{2}}{4\sqrt{5}} = \frac{0}{4\sqrt{5}} = \boxed{0}$$

$$2 \sin^2 x + \cos^2 x = \frac{8}{5}$$

$$\rightarrow 2(1 - \cos^2 x) + \cos^2 x = \frac{8}{5}$$

$$\rightarrow 2 - 2 \cos^2 x + \cos^2 x = \frac{8}{5}$$

$$\rightarrow 2 - \cos^2 x = \frac{8}{5}$$

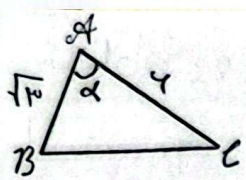
$$\rightarrow \cos^2 x = 2 - \frac{8}{5} = \frac{2}{5}$$

$$1 + \tan^2 x = \frac{1}{\frac{4}{5}}$$

$$\rightarrow 1 + \tan^2 x = \frac{5}{4}$$

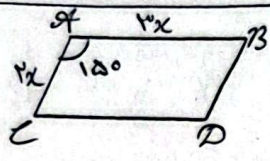
$$\rightarrow \tan^2 x = \frac{5}{4} - 1$$

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



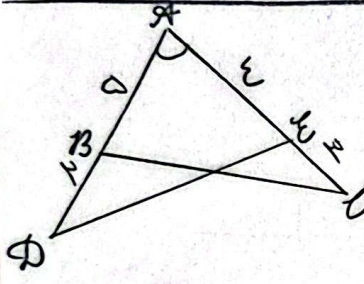
$$S_{ABC} = \frac{1}{2} \times 3 \times 4 \times \sin \alpha = \frac{1}{2} \times 3 \times \sqrt{3} \rightarrow 3 \sin \alpha = \frac{\sqrt{3}}{2} \rightarrow \sin \alpha = \frac{\sqrt{3}}{4} = \frac{1}{2\sqrt{3}} \quad (9)$$

$$\sin \alpha = \frac{\sqrt{3}}{4} \rightarrow 4^\circ \leq \alpha \leq 14^\circ \rightarrow \frac{14^\circ}{4^\circ} = \boxed{3.5} \quad (10)$$



$$S_{ABCD} = 3 \times 4 \times \sin(120^\circ) = 4 \times \frac{1}{2} = 2 \rightarrow x = 11$$

$$x = \sqrt{11} = \sqrt{11} \rightarrow \frac{1}{S_{ABCD}} = \frac{1}{2} \left(\frac{3 \times \sqrt{11}}{4\sqrt{3}} + \frac{4 \times \sqrt{11}}{4\sqrt{3}} \right) = \frac{1}{2} \times 11 \sqrt{3} = \boxed{5.5\sqrt{3}} \quad (11)$$



$$S_{ABC} - S_{ADE} = \frac{1}{2} \Delta$$

$$\rightarrow \left(\frac{1}{2} \times 3 \times 4 \times \sin \hat{A} \right) - \left(\frac{1}{2} \times 3 \times \epsilon \times \sin \hat{A} \right) = \frac{1}{2} \Delta$$

$$\rightarrow \frac{3 \Delta}{2} \sin \hat{A} - \frac{1}{2} \epsilon \sin \hat{A} = \frac{1}{2} \Delta$$

$$\rightarrow \frac{3}{2} \sin \hat{A} = \frac{1}{2} \rightarrow \sin \hat{A} = \frac{1}{3} = \frac{1}{\sqrt{9}} \quad (12)$$

$$\rightarrow \cos \hat{A} = \frac{\sqrt{8}}{3}$$

$$\tan \hat{A} = \frac{1}{\sqrt{8}} = \frac{\sqrt{2}}{4} \quad (13)$$

$$BN = \frac{1}{3} NC \rightarrow BN = \frac{1}{4} NC \rightarrow BN:NC = 1:3 \quad (14)$$

$$\frac{BN}{BC} = \frac{1}{4} \quad \frac{BM}{AB} = t \rightarrow \frac{AM}{AB} = 1-t \Rightarrow \frac{S_{BMN}}{S_{ABC}} = \frac{BM}{AB} \times \frac{BN}{BC} = t \times \frac{1}{4}$$

$$\frac{S_{BMN}}{S_{ABC}} = \frac{1}{4} \rightarrow \frac{1}{4} = \frac{1}{4} t \rightarrow t = \frac{1}{4} \rightarrow \frac{BM}{AM} = \frac{t}{1-t} = \frac{\frac{1}{4}}{\frac{3}{4}} = \boxed{\frac{1}{3}} \quad (15)$$

$$\frac{|\sin \alpha|}{\cos \alpha} = -\frac{1}{\cot \alpha} \rightarrow \frac{|\sin \alpha|}{\cos \alpha} = -\tan \alpha \quad (16)$$

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

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

$$\alpha \text{ در ناحیه سوم است} \quad (17)$$

$$|\sin \alpha| \times |\cos \alpha| = \sin \alpha \times \cos \alpha = -\tan$$

$$\Rightarrow \sin \alpha < 0, \cos \alpha < 0$$

$$\frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{2} \times AB \times \cancel{AN} \times \cancel{\sin \hat{B}}}{\frac{1}{2} \times BM \times \cancel{CN} \times \cancel{\sin \hat{B}}} = \frac{1}{2} \rightarrow \frac{AB}{BM} = \frac{AN}{CN}$$

9

$$\frac{BM}{BM + AM} = \frac{AN}{CN} \rightarrow \begin{matrix} BM = AN \\ AM = CN \end{matrix} \rightarrow \frac{BM}{AM} = \boxed{\frac{AN}{CN}}$$