

۲۰ علی (با علامت خند)

الف) $\tan \frac{\pi}{4} + \sin \frac{3\pi}{4} \cos \frac{\pi}{4}$
 $\frac{11\pi}{4} = \frac{\pi}{4} + \frac{3\pi}{4} \rightarrow \frac{\pi}{4}$ (برای یکنواختی)
 $\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \frac{2}{4} + \frac{2}{4} = \frac{4}{4} = 1$
 $-1 + \frac{1}{2} = -\frac{2}{2} + \frac{1}{2} = -\frac{1}{2}$

ب) $\tan \frac{5\pi}{4} \sin \frac{2\pi}{3} + \cos \frac{\pi}{3}$
 $\frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{2} = \frac{\sqrt{3}}{2\sqrt{2}} + \frac{1}{2}$
 $\frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{2} = \frac{\sqrt{3}}{2\sqrt{2}} + \frac{1}{2}$

$\cot \alpha = 4 \rightarrow 1 + \cot^2 \alpha = \frac{1}{\sin^2 \alpha} \rightarrow 1 + 16 = \frac{1}{\sin^2 \alpha} \rightarrow \frac{1}{\sin^2 \alpha} = 17 \rightarrow \sin^2 \alpha = \frac{1}{17} \rightarrow \sin \alpha = \pm \frac{1}{\sqrt{17}}$

$\frac{1}{17} + \cos^2 \alpha = 1 \rightarrow \cos^2 \alpha = 1 - \frac{1}{17} = \frac{16}{17} \rightarrow \cos \alpha = \pm \frac{4}{\sqrt{17}}$
 $\sin \alpha = \frac{1}{\sqrt{17}}, \cos \alpha = \frac{4}{\sqrt{17}} \rightarrow \sin \alpha = \frac{1}{\sqrt{17}}$
 $3 \left(\frac{4\sqrt{17}}{17} \right) - \frac{\sqrt{17}}{17} = \frac{12\sqrt{17} - \sqrt{17}}{17} = \frac{11\sqrt{17}}{17}$
 $\frac{\sqrt{17}}{17} + \frac{4\sqrt{17}}{17} = \frac{5\sqrt{17}}{17}$



$\sin \alpha = r \cos \alpha$

$r \cos \alpha + \cos \alpha = 1$

$\omega \cos \alpha = 1 \rightarrow \cos \alpha = \frac{1}{\omega} \rightarrow \cos \alpha = \frac{1}{\sqrt{5}} \rightarrow \frac{1}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{5}$

الف) $\cos \left(\frac{\pi}{4} + \alpha \right) \rightarrow \cos \frac{\pi}{4} \cos \alpha - \sin \frac{\pi}{4} \sin \alpha$

$\left(\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} \right) - \left(\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} \right) = \frac{2}{4} - \frac{2}{4} = 0$

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

ب) $\sin \left(\frac{\pi}{4} + \alpha \right) = \sin \left(\frac{\pi}{4} \right) \cos \alpha + \cos \left(\frac{\pi}{4} \right) \sin \alpha$
 $\frac{\sqrt{2}}{2} \cos \alpha + \frac{\sqrt{2}}{2} \sin \alpha$
 $\frac{\sqrt{2}}{2} \cos \alpha + \frac{\sqrt{2}}{2} \sin \alpha = \frac{\sqrt{2}}{2} \left(\cos \alpha + \sin \alpha \right)$
 $1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha} \rightarrow \cos^2 \alpha = \frac{1}{1 + \tan^2 \alpha}$

$\cos^2 \alpha + \sin^2 \alpha = 1 \rightarrow \sin^2 \alpha = 1 - \cos^2 \alpha$

$2(1 - \cos^2 \alpha) + \cos^2 \alpha = \frac{4}{3}$

$2 - 2\cos^2 \alpha + \cos^2 \alpha = \frac{4}{3}$

$2 - \cos^2 \alpha = \frac{4}{3}$

$\cos^2 \alpha = \frac{2}{3}$

$\cos \alpha = \pm \frac{\sqrt{2}}{\sqrt{3}}$

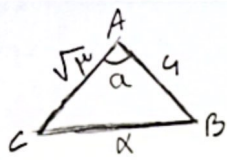
$\cos \alpha = \frac{\sqrt{2}}{\sqrt{3}}$

$\frac{1}{\frac{1}{2}} = \frac{2}{1}$

$\tan \alpha = \frac{y}{x} = \frac{1}{2}$

$\frac{1}{2} \rightarrow \frac{1}{2}$

$1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha}$



$$\frac{1}{x} \times \sqrt{10} \times \sqrt{10} \times \sin \alpha = \frac{1}{4} \times 4 \times \sin 40^\circ$$

$$\sin \alpha = \frac{1}{\sqrt{10}} \times \frac{1}{\sqrt{10}} = \frac{1}{10} \times \frac{\sqrt{10}}{\sqrt{10}} = \frac{\sqrt{10}}{10} \rightarrow \frac{\sqrt{10}}{10} \rightarrow \alpha$$

$$\alpha < 40^\circ$$

$$10^\circ$$

$$\frac{10}{9} = 1.11$$

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$$\left(\frac{1}{x} \times 10 \times 10 \times \sin 10^\circ \right) \times y = \Delta f$$

$$10 \times y = \Delta f \rightarrow y = \frac{\Delta f}{10} = 1 \rightarrow y = 1$$

$$10\sqrt{10} + 10\sqrt{10}$$

$$(10\sqrt{10}) \times 2 = 20\sqrt{10}$$

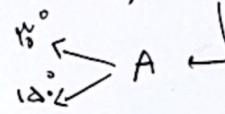
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$$S_{ABC} = \frac{1}{2} \times 10 \times 10 \times \sin \hat{A} = \frac{1}{2} \times 10 \times 10 \times \sin \hat{A} = 10 \times 10 \times \sin \hat{A}$$

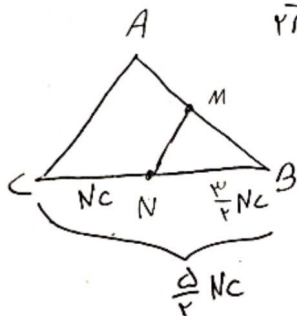
$$S_{ADE} = \frac{1}{2} \times 10 \times 10 \times \sin \hat{A} = 10 \times 10 \times \sin \hat{A} = 10 \times 10 \times \sin \hat{A} = 10 \times 10 \times \sin \hat{A}$$

$$\sin A = \frac{10 \times 10}{10 \times 10} = 1$$

$$\cos = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \leftarrow 10^\circ \leftarrow 0.17 \leftarrow 10^\circ$$



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$$\overline{BN} = \overline{NC} \rightarrow \overline{BN} = \frac{1}{2} \overline{NC}$$

$$S_{ABC} = \frac{1}{2} \times 10 \times 10 \times \sin \hat{B} = 10 \times 10 \times \sin \hat{B}$$

$$\frac{1}{2} \times 10 \times 10 = \frac{1}{2} \times 10 \times 10$$

$$\frac{BM}{AM} = \frac{10}{10} = 1$$

$$\Delta AM + \Delta MB = \Delta MB \rightarrow \Delta AM = \Delta MB$$

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

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

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

not
real

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