

الف) $\tan \frac{11\pi}{4} + \sin \frac{15\pi}{4} \cos \frac{13\pi}{4} =$

(1)

$$-1 + \frac{-\sqrt{2}}{2} \times \frac{-\sqrt{2}}{2} = -1 + \frac{2}{4} = -1 + \frac{1}{2} = -\frac{1}{2}$$

ب) $\tan \frac{11\pi}{4} \sin \frac{11\pi}{4} + \cos \frac{10\pi}{4} =$

$$\tan 2\pi + \frac{5\pi}{4} \times \sin 2\pi + \frac{5\pi}{4} + \cos 2\pi + \frac{\pi}{2} = -\frac{\sqrt{2}}{2} \times -\frac{\sqrt{2}}{2} + -\frac{1}{2} = \frac{2}{4} - \frac{1}{2} = 0$$

$\cot x = 2$ $\frac{2\cos x - \sin x}{\cos x + \sin x} \div \sin x = \frac{2\cot x - 1}{\cot x + 1} = \frac{2 \times 2 - 1}{2 + 1} = \frac{3}{5}$

(2)

$\sin a = 2\cos a$ $\cos a = ? = \sqrt{-\frac{1}{5}}$

(3)

$(2\cos a)^2 + \cos^2 a = 1 \rightarrow 4\cos^2 a + \cos^2 a = 5\cos^2 a = 1$

$\cos^2 a = \frac{1}{5}$ $\cos a = \pm \frac{1}{\sqrt{5}}$

الف) $\cos\left(\frac{11\pi}{4} + a\right) = \cos\left(2\pi + \frac{3\pi}{4} + a\right) \stackrel{11}{=} \cos a \cos \frac{3\pi}{4} - \sin a \sin \frac{3\pi}{4}$

(4)

$\cos a = -\sqrt{1 - \left(\frac{\sqrt{2}}{10}\right)^2} = -\sqrt{1 - \frac{2}{100}} = -\sqrt{\frac{98}{100}} = -\frac{\sqrt{98}}{10}$

$\rightarrow \left(-\frac{\sqrt{98}}{10}\right) \left(-\frac{\sqrt{2}}{10}\right) - \left(\frac{\sqrt{2}}{10}\right) \left(\frac{\sqrt{2}}{10}\right) = \frac{\sqrt{196}}{100} - \frac{2}{100} = \frac{194}{100} = \frac{97}{50}$

ب) $\sin\left(\frac{13\pi}{4} + a\right) = \sin\left(3\pi + \frac{\pi}{4} + a\right) = \sin a \cos \frac{\pi}{4} + \cos a \sin \frac{\pi}{4}$ $\sqrt{1^2 + 1^2} = \sqrt{2}$

$\sin \frac{13\pi}{4} = -\sin \frac{\pi}{4} = -\frac{\sqrt{2}}{2}$ $\cos \frac{13\pi}{4} = -\cos \frac{\pi}{4} = -\frac{\sqrt{2}}{2}$ $\cos a = \frac{1}{\sqrt{50}}$ $\sin a = \frac{1}{\sqrt{50}}$

$\sin a \cos \frac{\pi}{4} + \cos a \sin \frac{\pi}{4} = \left(-\frac{\sqrt{2}}{2}\right) \left(\frac{\sqrt{2}}{2}\right) + \left(-\frac{\sqrt{2}}{2}\right) \left(\frac{\sqrt{2}}{2}\right) = -\frac{2}{4} - \frac{2}{4} = -1$

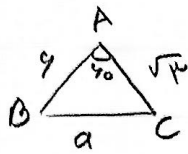
$2\sin^2 x + \cos^2 x = \frac{5}{4}$ $\sin^2 x + 1 = \frac{5}{4}$ $\sin^2 x = \frac{1}{4}$

(5)

$\cos^2 x = 1 - \frac{1}{4} = \frac{3}{4}$ $\tan^2 x = \frac{1}{3} = \sqrt{\frac{1}{3}}$

$$S = \frac{1}{2} \times 4 \times \sqrt{3} = 2\sqrt{3}$$

ضلع‌ها $a, 4, \sqrt{3}$



$$S = \frac{1}{2} \times 4 \times \sqrt{3} \times \sin \hat{A} = 2\sqrt{3} \rightarrow \sin \hat{A} = \frac{\sqrt{3}}{2}$$

$$\frac{a}{\sin \hat{A}} = \frac{4}{\sin \hat{C}} = \frac{\sqrt{3}}{\sin \hat{B}}$$

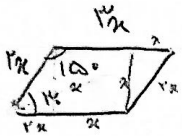
$$a = \sqrt{(\sqrt{3})^2 + 4^2 - 2 \times \sqrt{3} \times 4 \times \cos \hat{A}} =$$

$$(90^\circ) \rightarrow a = \sqrt{3 + 16 - 12\sqrt{3} \times \frac{1}{2}} = \sqrt{13 - 6\sqrt{3}}$$

$$\sin \hat{C} = \frac{\sqrt{3}}{a} = \frac{\sin \hat{B} \times 4}{\sqrt{3}}$$

$$(120^\circ) \rightarrow a = \sqrt{3 + 16 + 12\sqrt{3} \times \frac{1}{2}} = \sqrt{19 + 6\sqrt{3}}$$

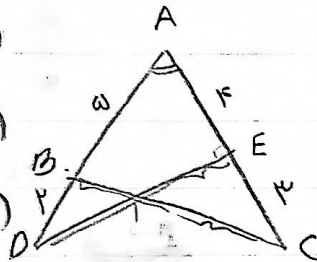
$$\frac{a_{\max}}{a_{\min}} = \frac{\sqrt{(19 + 6\sqrt{3})^2}}{14\sqrt{3}} = \frac{19 + 6\sqrt{3}}{\sqrt{14\sqrt{3}}}$$



$$\text{مساحت} = \frac{1}{2} \times \text{ارتفاع} \times \text{پایه} = \frac{1}{2} \times 10k \times 10k \times \sin 120^\circ = 25k^2 \times \frac{\sqrt{3}}{2}$$

$$k^2 = 16 \quad k = 4$$

$$\text{پاس} = 10k + 10k + 10k = 30k = 30 \times 4 = 120$$



$$\text{اقلان مساحت} = 1, \sqrt{3}$$

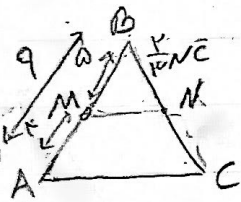
$$\tan \hat{A} = ?$$

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

$$S_{ABC} = \frac{1}{2} \times AB \times AC \times \sin \hat{A} = \sqrt{3} \sin \hat{A}$$

$$\sqrt{3} \sin \hat{A} - 1 \times \sin \hat{A} = 2 \sin \hat{A} = 2\sqrt{3} \rightarrow \sin \hat{A} = \frac{1}{\sqrt{3}} \rightarrow \hat{A} = 30^\circ$$

$$\tan \hat{A} = \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$$



$$2 \cdot BN = 3 \cdot NC$$

$$\frac{2}{3} + 1 = \frac{5}{3} \cdot NC$$

$$\frac{BM}{AM} = ?$$

$$\frac{S_{ABC}}{S_{BMN}} = \frac{AB \times BC}{BM \times BN} = \frac{AB}{BM} \times \frac{5}{3} = 3$$

$$\frac{AB}{BM} = \frac{9}{5}$$

$$\frac{BM}{AM} = \frac{9}{4} = 2,25$$

$$\frac{|\sin a|}{\cos a} = -\frac{1}{\cot a} \Rightarrow -\frac{\sin a}{\cos a} \rightarrow \sin a < 0$$

چون $|\sin a|$ برابر $\sin a$ است پس $\sin a$ منفی است

$$\frac{1}{\sqrt{\cos^2 a}} - \tan a = \frac{1 + \sin a}{1 \cos a} \Rightarrow \frac{1}{\cos a} - \frac{\sin a}{\cos a} \rightarrow \cos a > 0$$

چون $1 + \sin a$ برابر $\sin a$ است پس $\cos a$ مثبت است

نام به نام