

الف) $\tan \frac{11\pi}{4} + \sin \frac{13\pi}{4} \times \cos \frac{13\pi}{4} = -1 + (-\sqrt{2} \times -\sqrt{2}) = -1 + 2 = 1$
 $\frac{11\pi}{4} = 2\pi + \frac{3\pi}{4} \Rightarrow \tan(\frac{11\pi}{4}) = \tan(\frac{3\pi}{4}) = -1$
 $\frac{13\pi}{4} = 3\pi + \frac{\pi}{4} \Rightarrow \sin \frac{13\pi}{4} = \sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$ / $\frac{13\pi}{4} = 3\pi + \frac{\pi}{4} \Rightarrow \cos \frac{13\pi}{4} = \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$
 ب) $\tan \frac{17\pi}{4} \sin \frac{11\pi}{4} + \cos \frac{10\pi}{4} = (-\sqrt{2} \times \frac{\sqrt{2}}{2}) - \frac{1}{2} = -1 - \frac{1}{2} = -\frac{3}{2}$
 $\sin \frac{17\pi}{4} = \sin \frac{9\pi}{4} = -\frac{\sqrt{2}}{2}$ / $\cos \frac{10\pi}{4} = \cos \frac{5\pi}{2} = -\frac{1}{2}$
 $\tan \frac{17\pi}{4} = \tan \frac{9\pi}{4} = -\frac{\sqrt{2}}{2}$

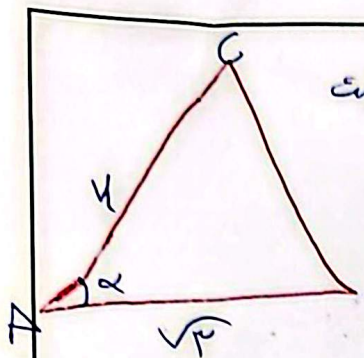
$\frac{\cos x}{\sin x} = 2 \Rightarrow \cos x = 2 \sin x$
 $\frac{2 \cos x - \sin x}{\cos x + \sin x} = \frac{2(2 \sin x) - \sin x}{2 \sin x + \sin x} = \frac{3 \sin x}{3 \sin x} = 1$

اشکال: یک ربع دوم $\sin -$ و $\cos -$
 $\sin^2 x + \cos^2 x = 1 \Rightarrow (2 \cos)^2 + \cos^2 = 1 \Rightarrow 4 \cos^2 + \cos^2 = 1 \Rightarrow 5 \cos^2 = 1 \Rightarrow \cos^2 = \frac{1}{5} \Rightarrow \cos x = \pm \frac{1}{\sqrt{5}}$
 چون ربع دوم است $\cos x = -\frac{1}{\sqrt{5}}$

الف) α در ربع دوم $\Rightarrow \sin \alpha = \frac{\sqrt{2}}{10}$ و $\cos \alpha = -\frac{1}{10}$
 $\cos(\frac{11\pi}{4} + \alpha) = \cos(\frac{3\pi}{4} + \alpha) = \cos \frac{3\pi}{4} \cos \alpha - \sin \frac{3\pi}{4} \sin \alpha = -\frac{\sqrt{2}}{2} \cos \alpha - \frac{\sqrt{2}}{2} \sin \alpha$
 $= -\frac{\sqrt{2}}{2} \times (-\frac{1}{10}) - \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{10} = \frac{\sqrt{2}}{20} - \frac{2}{20} = \frac{\sqrt{2}-2}{20}$
 ب) $\tan \alpha = \frac{1}{2}$ و α در ربع اول $\Rightarrow \sin(\frac{17\pi}{4} + \alpha) = \sin(\frac{9\pi}{4} + \alpha) = \sin(\frac{\pi}{4} + \alpha)$
 $\sin \frac{\pi}{4} \cos \alpha + \cos \frac{\pi}{4} \sin \alpha = \frac{\sqrt{2}}{2} \cos \alpha + \frac{\sqrt{2}}{2} \sin \alpha = \frac{\sqrt{2}}{2} (\cos \alpha + \sin \alpha)$
 $\sin^2 x + \cos^2 x = \frac{1}{5} \Rightarrow \sin^2 x + \cos^2 x = 1$

$\sin^2 x + \cos^2 x = \frac{1}{5} \Rightarrow \sin^2 x + \cos^2 x = 1$
 $\tan^2 x = \frac{\sin^2 x}{\cos^2 x} = \frac{\frac{1}{5}}{\frac{4}{5}} = \frac{1}{4} \Rightarrow \tan x = \pm \frac{1}{2}$
 $\sin^2 x = \frac{1}{5} \Rightarrow \sin x = \pm \frac{1}{\sqrt{5}}$
 $\cos^2 x = \frac{4}{5} \Rightarrow \cos x = \pm \frac{2}{\sqrt{5}}$

$\sin x + \cos x = \frac{10\sqrt{2}}{10} = \sqrt{2}$
 $\sin^2 x + \cos^2 x = 1 \Rightarrow \sin^2 x + 4 \sin^2 x = 1 \Rightarrow 5 \sin^2 x = 1 \Rightarrow \sin^2 x = \frac{1}{5} \Rightarrow \sin x = \pm \frac{1}{\sqrt{5}}$
 $\cos^2 x = 1 - \sin^2 x = 1 - \frac{1}{5} = \frac{4}{5} \Rightarrow \cos x = \pm \frac{2}{\sqrt{5}}$

$\sqrt{r} \times 4 = 4\sqrt{r}$


$$S_{ABC} = \frac{1}{2} \sin \alpha \times AB \times AC \Rightarrow r_1 = \frac{1}{2} \sin \alpha (4\sqrt{r})$$

$$\sin \alpha = \frac{r_1}{r\sqrt{r}} = \frac{1}{\sqrt{r}} \times \frac{\sqrt{r}}{\sqrt{r}} = \frac{\sqrt{r}}{\sqrt{r}} = \frac{\sqrt{r}}{\sqrt{r}}$$

$$\sin \alpha = \frac{\sqrt{r}}{\sqrt{r}} \Rightarrow \alpha = \frac{\sqrt{r}}{\sqrt{r}} \text{ (min)}$$

$$\alpha_{\max} = \frac{\sqrt{r}}{\sqrt{r}} = \frac{\sqrt{r}}{\sqrt{r}} \Rightarrow \alpha = \frac{\sqrt{r}}{\sqrt{r}} \text{ (max)}$$

$\frac{S}{a} = \frac{\omega r}{b} = \frac{r}{r} = 1$
 $\alpha = 10^\circ$
 $a = r_m$
 $b = r_m$

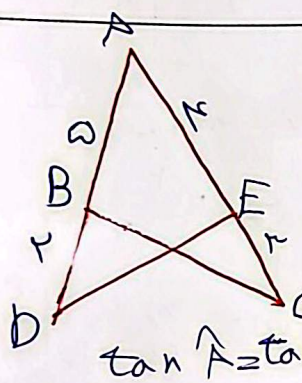
$$S = ab \sin \alpha \Rightarrow \omega r = (r_m)(r_m) \times \frac{1}{r}$$

$$\Rightarrow m^2 = 1 \Rightarrow m = \sqrt{1} = \sqrt{r}$$

$$a = r_m \Rightarrow r \times \sqrt{r} = 4\sqrt{r}$$

$$b = r_m \Rightarrow r \times \sqrt{r} = 4\sqrt{r}$$

$$P = r(a+b) = r(4\sqrt{r} + 4\sqrt{r}) = r(8\sqrt{r})$$

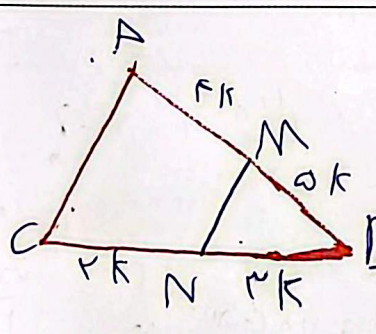


$$S_{ABC} - S_{ADE} = 1, \sqrt{a}$$

$$S_{ABC} = \frac{1}{2} \times a \times r \times \sin \hat{A} = 1, \sqrt{a} \sin \hat{A}$$

$$S_{ADE} = \frac{1}{2} \times \frac{r}{2} \times \frac{r}{2} \times \sin \hat{A} = \frac{1}{4} r \sin \hat{A}$$

$$\tan \hat{A} = \tan 30^\circ = \frac{\sqrt{3}}{3} \Rightarrow \hat{A} = 30^\circ \Rightarrow \sin \hat{A} = \frac{1}{2} \Rightarrow \frac{r}{4} \sin \hat{A} = 1, \sqrt{a}$$



$$r \cdot BN = r \cdot NC \Rightarrow \frac{BN}{NC} = \frac{r}{r} \Rightarrow \frac{BN}{NC} = \frac{r}{r}$$

$$S_{ABC} = r S_{BMN}$$

$$\frac{S_{ABC}}{S_{BMN}} = \frac{\frac{1}{2} \times AB \times BC \times \sin \hat{B}}{\frac{1}{2} \times BM \times BN \times \sin \hat{B}} = \frac{AB \times BC}{BM \times BN} = \frac{r \times k}{r \times k} = \frac{r}{r}$$

$$\frac{BM}{AM} = \frac{CN}{AN} = \frac{r}{r} = 1$$

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

$$\Rightarrow -\frac{\sin \alpha}{\cos \alpha} = \frac{\sin \alpha}{|\cos \alpha|} \Rightarrow \cos \alpha < 0 \Rightarrow -\frac{\sin \alpha}{\cos \alpha} = \frac{\sin \alpha}{-\cos \alpha} \Rightarrow \sin \alpha = 0 \Rightarrow \alpha = 0^\circ$$

$$\frac{|\sin \alpha|}{\cos \alpha} = \frac{1}{\cos \alpha} \Rightarrow \frac{\sin \alpha}{\cos \alpha} = \frac{1}{\cos \alpha} \Rightarrow \sin \alpha = 1 \Rightarrow \alpha = 90^\circ$$

$$I \cap II = \{ \alpha \mid \alpha = 0^\circ \text{ or } \alpha = 90^\circ \}$$