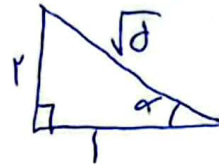


$$\text{الف) } \tan \frac{11\pi}{4} + \sin \frac{10\pi}{4} \cos \frac{13\pi}{4} = \tan \left(2\pi - \frac{\pi}{4} \right) + \sin \left(2\pi - \frac{\pi}{4} \right) \cos \left(2\pi + \frac{\pi}{4} \right) \\ = -\tan \frac{\pi}{4} + \left(-\sin \frac{\pi}{4} \right) \left(-\cos \frac{\pi}{4} \right) = -1 + \frac{1}{\sqrt{2}} = \frac{-\sqrt{2} + 1}{\sqrt{2}}$$

$$\text{ب) } \tan \frac{11\pi}{4} \sin \frac{11\pi}{4} + \cos \frac{10\pi}{4} = \tan \left(2\pi - \frac{\pi}{4} \right) \sin \left(2\pi - \frac{\pi}{4} \right) + \cos \left(2\pi + \frac{\pi}{4} \right) \\ = \left(-\tan \frac{\pi}{4} \right) \left(-\sin \frac{\pi}{4} \right) + \left(-\cos \frac{\pi}{4} \right) = \left(-\frac{\sqrt{2}}{2} \right) \left(-\frac{\sqrt{2}}{2} \right) + \left(-\frac{1}{\sqrt{2}} \right) = 0$$

$$\frac{13 \cos \alpha - \sin \alpha}{\cos \alpha + \sin \alpha} = \frac{13 \sin \alpha - \sin \alpha}{\sin \alpha + \sin \alpha} = \frac{11 \sin \alpha}{2 \sin \alpha} = \frac{11}{2} = 5.5 \\ \cot \alpha = 5.5 = \frac{\cos \alpha}{\sin \alpha} = 5.5 \Rightarrow \cos \alpha = 5.5 \sin \alpha$$

$$\sin \alpha = 2 \cos \alpha \rightarrow \tan \alpha = \frac{\sin \alpha}{\cos \alpha} = 2 \\ \text{پس } \rightarrow \cos \alpha < 0 \quad \sin \alpha < 0 \\ \cos \alpha = \frac{-1}{\sqrt{5}} = \frac{-\sqrt{5}}{5}$$



$$\text{الف) } \cos \left(\frac{11\pi}{4} + \alpha \right) = \cos \frac{11\pi}{4} \cos \alpha - \sin \frac{11\pi}{4} \sin \alpha = \frac{\sqrt{2}}{2} \cos \alpha - \left(-\frac{\sqrt{2}}{2} \right) \sin \alpha \\ = \frac{\sqrt{2}}{2} \cos \alpha + \frac{\sqrt{2}}{2} \sin \alpha = \frac{\sqrt{2}}{2} (\cos \alpha + \sin \alpha) \\ \text{ب) } \sin \left(\frac{11\pi}{4} + \alpha \right) = \sin \frac{11\pi}{4} \cos \alpha + \cos \frac{11\pi}{4} \sin \alpha = \left(-\frac{\sqrt{2}}{2} \right) \cos \alpha + \frac{\sqrt{2}}{2} \sin \alpha \\ = \frac{\sqrt{2}}{2} (\sin \alpha - \cos \alpha)$$

$$\left. \begin{aligned} 13 \sin^2 \alpha + \cos^2 \alpha &= \frac{13}{4} \\ \sin^2 \alpha + \cos^2 \alpha &= 1 \end{aligned} \right\} \Rightarrow \sin^2 \alpha = \frac{1}{4} \quad \cos^2 \alpha = 1 - \frac{1}{4} = \frac{3}{4}$$

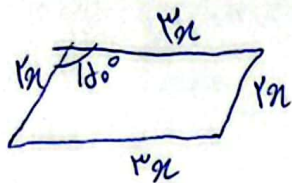
$$\tan^2 \alpha = \frac{\sin^2 \alpha}{\cos^2 \alpha} = \frac{\frac{1}{4}}{\frac{3}{4}} = \frac{1}{3}$$



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

$$\sin \alpha = \frac{r/d}{\sqrt{3}} = \frac{1/d}{\sqrt{3}} = \frac{1/d\sqrt{3}}{1} = \frac{\sqrt{3}}{r}$$

$$\frac{\max \alpha}{\min \alpha} = \frac{110^\circ}{40^\circ} = r$$



$$S = d^2 \sin \alpha = 10^2 \times \sin 100^\circ = 100 \times \frac{1}{2} = 50$$

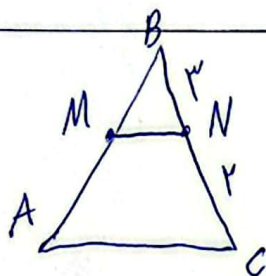
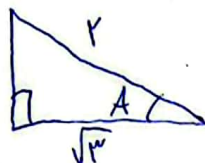
$$x^2 = 11 \quad x = \sqrt{11} = 3\sqrt{3}$$

$$yp = 10x = 10 \times 3\sqrt{3} = 30\sqrt{3}$$

$$S_{ABC} - S_{ADE} = 1/d = \frac{1}{r} \sin A \left(\frac{d \times \sqrt{3}}{r} - \frac{\sqrt{3} \times r}{r} \right) = 1/d$$

$$\sin A = \frac{1}{r}$$

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



$$\frac{BN}{NC} = \frac{r}{r} = 1/d \quad \frac{BC}{BN} = \frac{d}{r}$$

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

$$\frac{AB}{BM} = \frac{r}{d} \Rightarrow \frac{AM}{BM} = \frac{r}{d} \Rightarrow \frac{BM}{AM} = \frac{d}{r}$$

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

$$\Rightarrow \frac{1}{|\cos \alpha|} - \frac{\sin \alpha}{\cos \alpha} = \frac{1 + \sin \alpha}{|\cos \alpha|} \Rightarrow \cos \alpha < 0 \quad \text{②}$$

$$\Rightarrow \sin \alpha < 0 \quad \text{①}$$

②① ⇒ ...