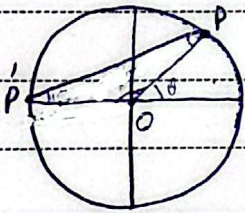


11 : میدان ریاضی

$$\frac{a \sin \frac{\pi}{4} + b \cos \frac{\pi}{4}}{a \sin \frac{3\pi}{4} + b \cos \frac{\pi}{4}} = \tan \alpha \quad \text{و نیز} \quad \frac{ax - \frac{\sqrt{2}}{2} + bx - \frac{\sqrt{2}}{2}}{ax - \frac{1}{2} + bx - \frac{1}{2}} = \frac{-\sqrt{2}}{1} \quad (1)$$

$$\frac{-\frac{\sqrt{2}}{2}(a+b)}{\frac{1}{2}(b-a)} = \frac{-\sqrt{2}}{1} \rightarrow \frac{a+b}{b-a} = \frac{1}{\sqrt{2}} \rightarrow \sqrt{2}a + \sqrt{2}b = b - a \rightarrow \sqrt{2}a = -\sqrt{2}b \rightarrow \frac{a}{b} = -1 \quad \checkmark$$



(2) چون $\frac{1}{\sqrt{2}} \sin \theta$ است پس $\theta = 45^\circ$
 $\theta_0 + 180^\circ = 135^\circ$ (برای $\theta_0 = 45^\circ$)
 $\angle POP' = 180^\circ$

$$|PP'| = OP + OP' = \sqrt{2} + \sqrt{2} = 2\sqrt{2}$$

$$\frac{\pi}{4} = \frac{135^\circ}{9} = 15^\circ \rightarrow \text{مقدار زاویه بین دو خط} \rightarrow \text{زاویه} \rightarrow 2:15 \quad (3)$$

$$\alpha = \left| \frac{11}{2}M - 90^\circ \right| = 45^\circ \quad \left| \frac{11}{2}M - 90^\circ \right| = 45^\circ$$

بالا $\frac{11}{2}M - 90^\circ = -45^\circ \rightarrow M = 15^\circ$
 پایین $\frac{11}{2}M - 90^\circ = 45^\circ \rightarrow M = 30^\circ$

(4) $\frac{\pi}{4} < \alpha < \frac{3\pi}{4}$ $\frac{\pi}{4} < \sin \alpha < 1$ $\frac{\pi}{4} < \frac{M-3}{5} < 1$

$\frac{\pi}{4} < M-3 < 5$ $3 < M < 8$ $\frac{\pi}{4} < M < 8$

$$\tan 10^\circ = \frac{\sin 10^\circ}{\cos 10^\circ} = \frac{1}{r} \rightarrow \sin 10^\circ = \frac{1}{r} \quad \cos 10^\circ = r$$

$$\sin(90^\circ + 10^\circ) + K \cos(180^\circ - 10^\circ)$$

$$\cos 10^\circ = K \sin 10^\circ$$

$$\cos(180^\circ - 10^\circ) + r \sin(180^\circ + 10^\circ)$$

$$-\cos 10^\circ - r \sin 10^\circ$$

$$\frac{r - K}{-r} = r \rightarrow r - K = -r \rightarrow K = 2r$$

$$1 - \cos 30^\circ = r + r \cos 30^\circ \rightarrow \cos 30^\circ = \frac{1}{r}$$

$$\sin 30^\circ = r\sqrt{r}$$

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

$$\cot \alpha = -\frac{1}{\sqrt{r}}$$

$$\tan\left(\frac{\pi}{2} - \alpha\right) = \cot(\pi - \alpha)$$

$$\cot\left(\frac{\pi}{2} - \alpha\right) + r \tan(\pi - \alpha)$$

$$+ \tan \alpha = r \tan \alpha$$

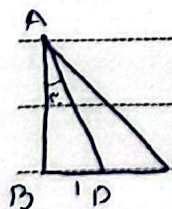
$$-\frac{1}{r} = -1$$

$$-r \cot \alpha = -\frac{1}{r}$$

$$\frac{\text{Rad}}{r} = \frac{D}{10^\circ} \rightarrow \frac{n}{r} = \frac{10^\circ}{10^\circ} \rightarrow n = \frac{4\pi}{10}$$

$$\alpha_1 R_1 = \alpha_2 R_2 \rightarrow \frac{4\pi}{10} R_1 = \frac{9\pi}{10} R_2 \rightarrow \frac{R_1}{R_2} = \frac{9}{4}$$

$$\frac{\pi R_A}{\pi R_B} = \left(\frac{9}{4}\right)^2 = \frac{9}{4}$$

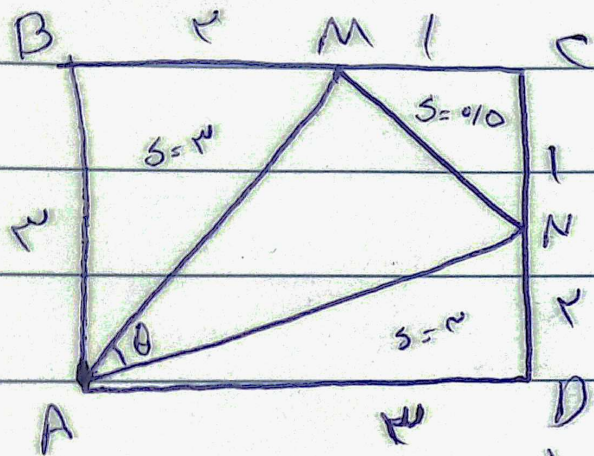


$$A_1 = 30^\circ \rightarrow \sin 30^\circ = \frac{1}{2} \rightarrow AD = r \rightarrow AB = \sqrt{r}$$

$$5 = \sqrt{r} \rightarrow AB \times BC = \sqrt{r} \rightarrow BC = r$$

$$\tan C = \frac{AB}{BC} = \frac{\sqrt{r}}{r} \rightarrow \cos C = \frac{1}{1 + \tan^2 C} = \frac{1}{1 + \frac{r}{r}} = \frac{1}{2}$$

$$\cos C = \frac{r}{\sqrt{r}}, \sin C = \frac{\sqrt{r}}{\sqrt{r}} \rightarrow \sin C = r \sin C \cos C \rightarrow \frac{\sqrt{r}}{\sqrt{r}} \times \frac{r}{\sqrt{r}} = \frac{r\sqrt{r}}{\sqrt{r}}$$



(10)

برس $S = 9$ $\sin S = 9 \Rightarrow 9/10 = 1/2$

$AN = AM = \sqrt{9 + 4} = \sqrt{13}$

برس $S = \frac{\sqrt{12} \times \sqrt{12} \times \sin \theta}{2} = 1/2 \Rightarrow \sin \theta = \frac{1}{12}$

✓