

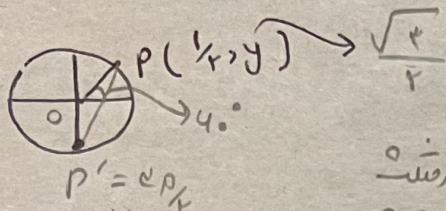
سوال (۱)

$$\frac{a \sin \frac{\pi}{4} + b \cos \frac{\pi}{4}}{a \sin \frac{11\pi}{4} + b \cos \frac{\pi}{4}} = \tan \frac{\pi}{4} \quad \frac{b}{a} = ?$$

$$\frac{(ax - \frac{\sqrt{2}}{2}) + (bx - \frac{\sqrt{2}}{2})}{(ax - \frac{1}{2}) + (bx - \frac{1}{2})} = -\frac{\sqrt{2}}{2} \Rightarrow \frac{(-\frac{\sqrt{2}}{2}a) + (-\frac{\sqrt{2}}{2}b)}{(-\frac{1}{2}a) + (\frac{1}{2}b)} = \frac{-\frac{\sqrt{2}}{2}(a+b)}{\frac{1}{2}(b-a)} = -\frac{\sqrt{2}}{2}$$

$$+ \frac{\sqrt{2}}{2}(a+b) = \frac{\sqrt{2}}{2}(b-a) \Rightarrow 2a + 2b = b - a \Rightarrow 3a = -2b \Rightarrow \frac{b}{a} = -\frac{3}{2}$$

$$\Rightarrow \boxed{\frac{b}{a} = -\frac{3}{2}}$$



$$P(\frac{1}{2}, \frac{\sqrt{2}}{2}), P'(0, -1)$$

$$45^\circ + 210^\circ = 255^\circ = \frac{17\pi}{12}$$

$$= \text{مسافت } P'(0, -1)$$

$$\left. \begin{array}{l} 255^\circ - 210^\circ = 45^\circ \\ 180^\circ - 150^\circ = 30^\circ \\ 30^\circ + 15^\circ = 45^\circ \end{array} \right\} \begin{array}{l} \cos P = 1 \\ \sin P = 1 \end{array}$$

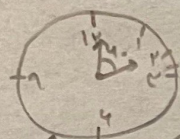
$$\text{ضع } P P' = \sqrt{(x-x')^2 + (y-y')^2}$$

$$\Rightarrow P P' = \sqrt{2 - \sqrt{2}} \Rightarrow \boxed{\frac{1}{\sqrt{2}} = 1 + 1 + \sqrt{2 - \sqrt{2}}}$$

$$2 \times 30^\circ = 60^\circ = \frac{\pi}{3}$$

$$\frac{\pi}{3} + \frac{\pi}{9} = \frac{3\pi + \pi}{9} = \frac{4\pi}{9}$$

$$\frac{D}{180} = \frac{R}{n} \Rightarrow \frac{D}{180} = \frac{4\pi}{9} \Rightarrow 4D = 4 \times 180 \Rightarrow D = 180$$



$$3 \times 2 = 6 \Rightarrow \frac{\pi}{9} = 20^\circ$$

$$\Rightarrow 2 \times 4 = 8 \Rightarrow \boxed{2 = 2}$$

نصف دایره = فاصله بین دو نقطه

سوال (۴)

$$|\frac{11M}{2} - 3.14| = 2 \Rightarrow \frac{11M}{2} - 3.14 = \pm 2$$

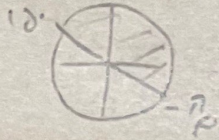
$$\frac{11M}{2} - 3.14 = 2 \Rightarrow \frac{11M}{2} = 5.14 \Rightarrow M = 2$$

$$\frac{11M}{2} - 3.14 = -2 \Rightarrow M = \frac{1.14}{11}$$

سؤال ٥

$$-\frac{\pi}{4} < x \leq \frac{2\pi}{4} \quad \sin x = \frac{m-r}{\omega} \Rightarrow -\frac{1}{4} \leq \sin x \leq 1 \Rightarrow$$

$$\left. \begin{array}{l} -\frac{\pi}{4} < x \leq \frac{2\pi}{4} \\ -\frac{\pi}{4} < x \leq \frac{2\pi}{4} \end{array} \right\}$$



$$-\frac{1}{4} < \frac{m-r}{\omega} \leq 1 \Rightarrow -\frac{\omega}{4} < m-r \leq \omega$$

$$\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} \rightarrow \left[\frac{-\omega}{4}, \omega \right] \Rightarrow \frac{-\omega}{4} < m \leq \frac{\omega}{4} \Rightarrow -\frac{\omega}{4} < m \leq \frac{\omega}{4}$$

$$\tan 10^\circ = 0.176$$

سؤال ٦

$$\frac{\sin(10^\circ) + k \cos(140^\circ)}{\cos(140^\circ) + r \sin(140^\circ)} = r \Rightarrow \frac{\cos 10^\circ + k(-\sin 10^\circ)}{\cos 10^\circ + r(-\sin 10^\circ)} = r$$

$$k = ?$$

$$\div \cos 10^\circ \Rightarrow \frac{1 + k(-\tan 10^\circ)}{1 + r(-\tan 10^\circ)} = \frac{1 - k \tan 10^\circ}{1 - r \tan 10^\circ} = r \Rightarrow$$

$$\frac{1 - 0.176k}{1 - 0.176r} = \frac{1 - 0.176k}{0.176} = r \Rightarrow 1 - 0.176k = r \times 0.176 \Rightarrow 1 - 0.176 = 0.176r \Rightarrow r = \frac{0.824}{0.176} = 4.68$$

$$k = \frac{0.824}{0.176} = 4.68 \Rightarrow \boxed{k = 4.68}$$

سؤال ٧

$$\cos x = r \cos x$$

$$\tan\left(\frac{\pi}{4} - x\right) = \cot(\pi - x)$$

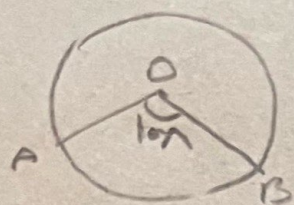
$$\frac{1 - \cos x}{1 + \cos x} = r$$

$$\frac{\cot\left(\frac{\pi}{4} - x\right) + r \tan(\pi - x)}{1} = ?$$

$$\frac{\cot x + \cot x}{\tan x - r \tan x} = \frac{r \cot x}{- \tan x} = -r \cos x \quad \frac{1 - \cos x}{1 + \cos x} = r \Rightarrow$$

$$r(1 + \cos x) = 1 - \cos x \Rightarrow r + r \cos x = 1 - \cos x \Rightarrow r \cos x = -1 \Rightarrow$$

$$\cos x = -\frac{1}{r} \Rightarrow \sin x = \sqrt{1 - \cos^2 x} = \sqrt{1 - \frac{1}{r^2}} = \frac{\sqrt{r^2 - 1}}{r}$$



$$|AB| = 1 \cdot AR$$

$$|AB| = |A'B'| \Rightarrow 1 \cdot AR = 144R'$$

$$\frac{R}{R'} = \frac{144}{1} = \frac{4}{1} = 4$$

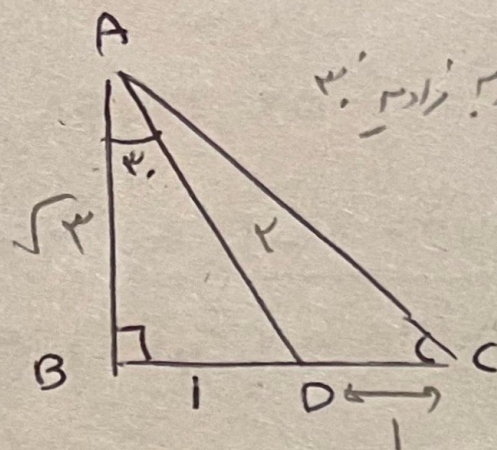


$$|A'B'| = \frac{9}{1} R'$$

$$\frac{D}{144} = \frac{R}{1} \Rightarrow \frac{D}{144} = \frac{9}{1} \Rightarrow D = 144 \cdot 9 = 1296$$

$$\frac{R^2}{R'^2} = \left(\frac{4}{1}\right)^2 = \frac{16}{1}$$

① ال ٤



$$\overline{AD} = 2$$

$$AD^2 = BD^2 + AB^2 \Rightarrow 4 = 1 + AB^2 \Rightarrow AB = \sqrt{3}$$

$$S_{\Delta ABC} = \sqrt{3} = \frac{AB \times BC}{2} = \sqrt{2} \Rightarrow AB \times BC = 2\sqrt{2}$$

$$AC^2 = AB^2 + BC^2 = 3 + 2 = 5$$

$$AC = \sqrt{5}$$

② ال ٤