

$$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\cos \frac{\pi}{3} = \frac{1}{2}$$

$$\sin \frac{2\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\cos \frac{2\pi}{3} = -\frac{1}{2}$$

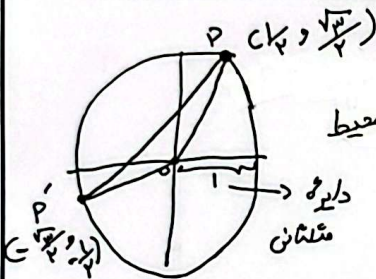
$$\tan \frac{2\pi}{3} = -\frac{\sqrt{3}}{1}$$

$$\frac{ax - \frac{\sqrt{3}}{2} + bx - \frac{\sqrt{3}}{2}}{ax - \frac{1}{2} + bx - \frac{1}{2}} = -\frac{1}{\sqrt{3}} \rightarrow \frac{-\frac{\sqrt{3}}{2}(a+b)}{\frac{1}{2}(-a+b)} = -\frac{1}{\sqrt{3}}$$

$$\rightarrow \frac{\sqrt{3}}{2}(a+b) = \frac{1}{2}(-a+b) \rightarrow \sqrt{3}a + \sqrt{3}b = -a + b$$

$$\rightarrow 4a = -2b \rightarrow 2a = -b \rightarrow b = -2a$$

$$\frac{b}{a} = \frac{-2a}{a} = -2$$



$$y = \sqrt{1 - \frac{1}{4}} = \frac{\sqrt{3}}{2}$$

$$OP + PP' \rightarrow OP + OP + P'P = 2 + \frac{\sqrt{3} + \sqrt{3}}{2} = \frac{4 + \sqrt{3} + \sqrt{3}}{2}$$

$$P'P = \sqrt{(x_P - x_{P'})^2 + (y_P - y_{P'})^2} = \sqrt{(\frac{1}{2} - (-\frac{1}{2}))^2 + (\frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2})^2} = \sqrt{1 + 0} = 1$$

$$\frac{D}{180} = \frac{Rad}{\pi} \rightarrow \frac{D}{180} = \frac{\pi}{\pi} \rightarrow D = \frac{180}{\pi} = 20^\circ \rightarrow \text{درجی که}$$

به ازای هر دو دقیقه عقربه ساعت شمار ۲۰ درجه حرکت می کند.

$$\frac{360}{12} = 30^\circ \rightarrow \text{زاویه بین هر ساعت}$$

$$30^\circ - 20^\circ = 10^\circ \rightarrow \text{زاویه بین هر دقیقه}$$

$$4 \text{ دقیقه از هر گذشت ۲۰ دقیقه}$$

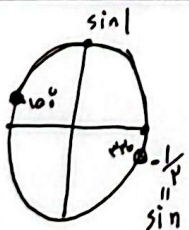
$$h = 3$$

$$|\omega m - 3h| = \text{زاویه بین دقیقه شمار و ساعت شمار}$$

$$\rightarrow |\omega m - 90| = 20$$

$$\begin{aligned} \omega m - 90 = 20 &\rightarrow \omega m = 110 \\ \omega m - 90 = -20 &\rightarrow \omega m = 70 \\ \omega m = 110 &\rightarrow m = \frac{110}{11} = 10 \\ \omega m = 70 &\rightarrow m = \frac{70}{11} = 6 \frac{4}{11} \end{aligned}$$

پس از گذشت ۲۰ دقیقه برای دومین بار زاویه ۲۰ درجه می شود.



$$-\frac{1}{4} < \sin x \leq 1 \rightarrow \frac{\sin x}{\frac{m-3}{\omega}} > -\frac{1}{4} < \frac{m-3}{\omega} \leq 1 \rightarrow \frac{\omega}{m-3} > -4 \leq m-3 \leq \omega$$

$$\frac{\omega}{m-3} > -4 \rightarrow \frac{1}{4} < m \leq 1$$

$$1, 2, 3, 4, 5, 6, 7, 8 \rightarrow \text{اعداد صحیح}$$

$$\sin(100) = \sin(90+10) = \cos 10$$

$$\cos(190) = \cos(90+10) = -\sin 10$$

$$\cos(170) = \cos(180-10) = -\cos 10$$

$$\sin(170) = \sin(180-10) = \sin 10$$

$$\frac{\cos 10 - k \sin 10}{-\cos 10 - \sqrt{2} \sin 10} = \frac{\cos 10}{1 - k \tan 10}$$

$$= \frac{1 - 0.1736k}{-1 - 0.1736} = \frac{1 - 0.1736k}{-1.1736} = \mu$$

$$\rightarrow 1 - 0.1736k = -\mu$$

$$\rightarrow 0.1736k = \mu \rightarrow k = \frac{\mu}{0.1736}$$

$$\frac{1 - \cos x}{1 + \cos x} = \mu \rightarrow 1 - \cos x = \mu + \mu \cos x \rightarrow \mu \cos x = -1 \rightarrow \cos x = -\frac{1}{\mu}$$

$$\cos^2 x + \sin^2 x = 1 \rightarrow \left(-\frac{1}{\mu}\right)^2 + \sin^2 x = 1 \rightarrow \sin^2 x = \frac{\mu^2 - 1}{\mu^2}$$

$$\sin x = \frac{\sqrt{\mu^2 - 1}}{\mu}$$

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

$$\cot(\pi - x) = -\cot x$$

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

$$\tan(\pi - x) = -\tan x$$

$$\frac{\cot x + \cot x}{\tan x - \tan x} = \frac{\mu \cot x}{-\tan x}$$

$$= \frac{\mu \times \frac{1}{\sqrt{\mu^2 - 1}}}{-\frac{1}{\sqrt{\mu^2 - 1}}} = -\frac{1}{\mu}$$

$$\tan x = \frac{\sqrt{\mu^2 - 1}}{\mu} = -\frac{\sqrt{\mu^2 - 1}}{\mu}$$

$$\cot x = -\frac{1}{\sqrt{\mu^2 - 1}}$$

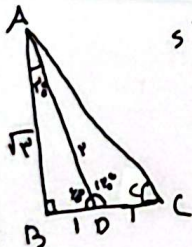
$$\frac{D}{180} = \frac{R_{ad}}{\pi} \rightarrow \frac{10\lambda}{180} = \frac{R_{ad}}{\pi} \rightarrow R_{ad} = \frac{10\lambda\pi}{180} = \frac{\pi\lambda}{18}$$

$$A\omega = \frac{\pi\lambda}{18} \times r_A$$

$$B\omega = \frac{9\pi}{10} \times r_B$$

$$A\omega = B\omega \rightarrow \frac{\pi\lambda}{18} \times r_A = \frac{9\pi}{10} r_B \rightarrow r_A = \frac{9}{5} r_B$$

$$\frac{S_A}{S_B} = \frac{\pi r_A^2}{\pi r_B^2} = \frac{\left(\frac{9}{5} r_B\right)^2}{r_B^2} = \frac{81}{25} = \frac{9}{5}$$



$$\sin 30^\circ = \frac{1}{2} = \frac{BD}{AD} \rightarrow AD = 2$$

$$AB^2 + BD^2 = AD^2$$

$$\rightarrow AB^2 = 4 - 1 = 3$$

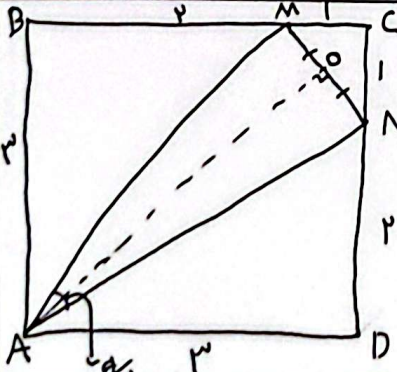
$$\rightarrow AB = \sqrt{3}$$

$$AC = \sqrt{2^2 + 1^2} = \sqrt{5}$$

$$\sin \angle C = \cos \angle B = \frac{1}{2}$$

$$\sin \angle C = \cos \angle B = \frac{1}{2}$$

$$\sin \angle C = \cos \angle B = \frac{1}{2}$$



$$MN = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$AN = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$AM = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$NO = \frac{\sqrt{2}}{2}$$

$$\sin \theta = \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2}$$

$$AO = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$\cos \theta = \frac{\sqrt{2}}{2}$$

$$\sin 2\theta = 2 \cos \theta \sin \theta$$

$$\sin \theta = 2 \cos \theta \sin \theta$$

$$= 2 \times \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2}$$

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