

17, 15

شماره 28

پازدهم سپهر

یا رسول و پیغمبر

(1)

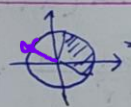
$$\frac{1}{|\cos a|} = \frac{\sin a}{\cos a} = \frac{1 - \sin a}{1 + \cos a} \Rightarrow |\cos a| = \cos a \Rightarrow \cos a > 0$$

$$\frac{\cos a}{|\sin a|} = \frac{\cos a}{\sin a} \Rightarrow \sin a = |\sin a| \Rightarrow \sin a > 0$$

سینا > 0  
کوسین > 0  
مربع اول ✓

(2)

$$\Rightarrow -\frac{\pi}{2} < \alpha < \frac{\pi}{2} \Rightarrow -\frac{1}{2} < \sin \alpha < \frac{\sqrt{2}}{2} \Rightarrow -\frac{1}{2} < \frac{m-1}{2} < \frac{\sqrt{2}}{2}$$

$$\Rightarrow -1 < m < \sqrt{2} + 1$$


(3)

$$\tan \alpha + \cot \alpha = \frac{\sin^2 \alpha + \cos^2 \alpha}{\sin \alpha \cos \alpha} = -2 = \frac{1}{\sin \alpha \cos \alpha} \Rightarrow \sin \alpha \cos \alpha = -\frac{1}{2}$$

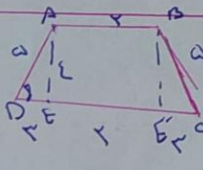
وقتی!  $\sin \alpha < 0, \cos \alpha > 0$  یا  $\sin \alpha > 0, \cos \alpha < 0$

$$\sin^2 \alpha + \cos^2 \alpha = (\sin \alpha + \cos \alpha)^2 - 2 \sin \alpha \cos \alpha = 1$$

$$1 - 2 \left(-\frac{1}{2}\right) = 1 \Rightarrow (\sin \alpha + \cos \alpha)^2 = 1 \Rightarrow \sin \alpha + \cos \alpha = \pm 1$$

سینا + کوسین = 1 یا -1

(4)



$$DE = AD \times \cos \theta = a \times \frac{1}{2} = \frac{a}{2}$$

$$PC = \frac{a+b}{2} = \frac{a}{2} + \frac{b}{2} = \frac{a+b}{2}$$

$$S = \frac{(a+b) \times h}{2} = \frac{a+b}{2} \times h = PC \times h$$

(5)

$$\tan(15^\circ) \times \tan(-15^\circ) - \sin(15^\circ) \times \cos(15^\circ) = -\cot(15^\circ) \times \tan(15^\circ) - \sin(15^\circ) \times \cos(15^\circ)$$

$$= -1 + \sin^2(15^\circ) = -\cos^2(15^\circ) = -\frac{1}{2}$$

(6)

$$A = \sqrt{2} \cos(45^\circ) \times \sin(45^\circ) - \sqrt{2} \sin(45^\circ) \times \cos(45^\circ) = \sqrt{2} \times \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} - \sqrt{2} \times \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2}$$

$$= \frac{2}{2} \times \cos(90^\circ) + \cos(90^\circ) = \frac{2}{2} \times 0 + 0 = 0$$

(7)

$$\Rightarrow f\left(\frac{\pi}{15}\right) = 15 \cos^2\left(\frac{\pi}{15}\right) \times \cos^2\left(\frac{\pi}{15}\right) \times \cos^2\left(\frac{\pi}{15}\right) \times \cos^2\left(\frac{\pi}{15}\right) = 15 \times \left(\frac{1-\sqrt{3}}{2}\right)^4 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{15(1-\sqrt{3})^4}{16}$$

$$\cos\left(\frac{\pi}{15}\right) = \cos\left(\frac{\pi}{5} - \frac{\pi}{3}\right) = \cos\left(\frac{\pi}{5}\right) \cos\left(\frac{\pi}{3}\right) + \sin\left(\frac{\pi}{5}\right) \sin\left(\frac{\pi}{3}\right) = \frac{1}{2} \times \frac{\sqrt{3}}{2} + \frac{\sqrt{5-\sqrt{5}}}{4} \times \frac{\sqrt{3}}{2} = \frac{(1-\sqrt{3})\sqrt{5}}{4}$$

(8)

$$1 - \sin^2 \alpha + \sin \alpha = -2 \Rightarrow \sin \alpha = \frac{-1 \pm \sqrt{1-4}}{2} = \frac{-1 \pm \sqrt{-3}}{2}$$

$$\cos^2 \alpha = 1 - \sin^2 \alpha = 1 - \frac{1-3}{4} = \frac{3}{4} \Rightarrow \cos \alpha = \pm \frac{\sqrt{3}}{2}$$

(9)

$$\tan \alpha = \frac{\tan\left(\frac{\pi}{4}\right)}{1 - \tan\left(\frac{\pi}{4}\right) \tan\left(\frac{\pi}{4}\right)} = \frac{1}{1-1} = \text{undefined}$$

$$\Rightarrow \alpha = \frac{\pi}{2}$$

$$\frac{\sin \theta + 1 + \cos \theta}{1 - \cos \theta} = \frac{2 \sin \frac{\theta}{2} \cos \frac{\theta}{2}}{2 \sin^2 \frac{\theta}{2}} + \frac{2 \cos^2 \frac{\theta}{2}}{2 \sin \frac{\theta}{2} \cos \frac{\theta}{2}} = \frac{\cos \frac{\theta}{2}}{\sin \frac{\theta}{2}} + \frac{\cos \frac{\theta}{2}}{\sin \frac{\theta}{2}} = 2 \cot \frac{\theta}{2} \quad (1)$$

$$\cos\left(\frac{11\pi}{2} + a\right) = \cos\left(\frac{3\pi}{2} + a\right) = \sin\left(-\frac{\pi}{2} - a\right) = -\sin\left(a + \frac{\pi}{2}\right)$$

$$\sin a + \cos a = \sqrt{2} \sin\left(a + \frac{\pi}{4}\right) \Rightarrow -\sin\left(a + \frac{\pi}{2}\right) = -\frac{\sin a + \cos a}{\sqrt{2}} = -\frac{\sqrt{2} - \sqrt{2}}{1} = \frac{2}{10} \quad (2)$$

$$\cos^2 a = 1 - \sin^2 a = 1 - \frac{4}{100} = \frac{96}{100} \Rightarrow \cos a = \frac{\sqrt{96}}{10} = \frac{4\sqrt{6}}{10} = \frac{2\sqrt{6}}{5} \quad (3)$$

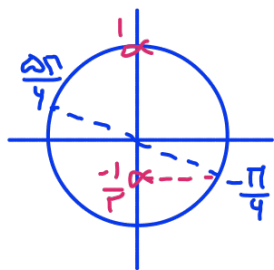
سال نو مبارک

سال خوبی داشته باشی

$$f\left(\frac{\pi}{34}\right) = 14 \cos^2\left(\frac{\pi}{13}\right) \cos^2\left(\frac{\pi}{4}\right) \cos^2\left(\frac{\pi}{6}\right) \cos^2\left(\frac{2\pi}{3}\right) \quad -v$$

$$\cos^2 \frac{\pi}{13} = \frac{1 + \cos \frac{2\pi}{13}}{2} \rightarrow \cos^2 \frac{\pi}{13} = \frac{2 + \sqrt{3}}{4}$$

$$f\left(\frac{\pi}{34}\right) = 14 \left(\frac{2 + \sqrt{3}}{4}\right) \times \frac{3}{4} \times \frac{1}{4} \times \frac{1}{4} = \frac{3(2 + \sqrt{3})}{14}$$



$$-\frac{1}{r} < \sin m \leq 1 \rightarrow -\frac{1}{r} < \frac{m-1}{r} \leq 1 \rightarrow m \in (-1, 1] \quad -2$$