

سوال ۱

$$\cot a = \frac{\cos a}{\sqrt{1-\cos^2 a}}, \quad \frac{1}{\sqrt{\cos^2 a}} - \frac{1}{\cot a} = \frac{1-\sin a}{|\cos a|}$$

$\alpha$  انبساطی = ?

$\sin a > 0 \Leftrightarrow |\sin a|$

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

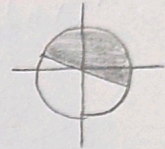
$\Rightarrow$  ربع اول = انبساطی  $\alpha$

$$\sin 2x = \frac{m-1}{4}, \quad -\frac{\pi}{12} < x < \frac{5\pi}{12}$$

$m$  مجموع مقادیر = ?

سوال ۲

$$-\frac{\pi}{12} < x < \frac{5\pi}{12} \rightarrow -\frac{\pi}{6} < 2x < \frac{5\pi}{6} \rightarrow -\frac{1}{2} < \sin 2x \leq 1$$



$$\Rightarrow -\frac{1}{2} < \frac{m-1}{4} \leq 1 \rightarrow -2 < m-1 \leq 4 \rightarrow -1 < m \leq 5$$

$\Rightarrow (-1, 5]$

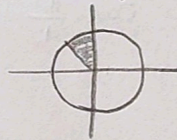
$$\tan x + \cot x = -3, \quad 3\pi < x < 4\pi$$

$$\frac{1}{\sin^3 x + \cos^3 x} = ?$$

سوال ۳

$$\tan x + \cot x = -3 \rightarrow \frac{1}{\sin x} = -3 \rightarrow \frac{1}{-3} = \sin x \cos x$$

$$3\pi < x < 4\pi \rightarrow \frac{3\pi}{4} < x < \pi$$

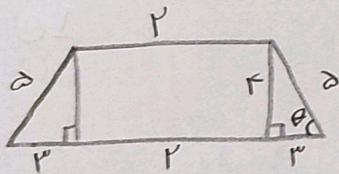


$$\frac{1}{\sin^3 x + \cos^3 x} = \frac{1}{(\sin x + \cos x)(1 - \sin x \cos x)} = \frac{1}{\frac{1}{-3} \cdot \frac{4}{-3}} = \frac{3\sqrt{3}}{4}$$

$$\text{زاویه حاده بین ساق و قاعده } \theta: \cos \theta = 0.4, \quad \text{سان} = 5, \quad \text{قطر دیواره} = 2$$

سوال ۴

مساحت نوزنگه = ?



$$S_{\text{نوزنگه}} = \frac{(2+8) \times 4}{2} = 20$$

$$\tan(18^\circ) \tan(-14^\circ) - \sin(1.9^\circ) \cos(25^\circ) = k \cos^2 15^\circ \quad k = ?$$

سوال ۵

$$\frac{\tan(18^\circ) \tan(-14^\circ)}{-\cot 15^\circ \tan 15^\circ} - \frac{\sin(1.9^\circ) \cos(25^\circ)}{\sin 15^\circ \sin 15^\circ} = (-\cot 15^\circ \tan 15^\circ) - \sin 15^\circ \sin 15^\circ$$

$$\rightarrow -1 + \sin^2 15^\circ = -\cos^2 15^\circ$$

$$-\cos^2 15^\circ = k \cos^2 15^\circ \rightarrow k = -1$$

$$A = \sqrt{3} \cos(110^\circ) \sin(143^\circ) - \sqrt{2} \sin(138^\circ) \cos(153^\circ) = ? \cos(27^\circ) \quad \text{سوال 9}$$

$$\underbrace{\sqrt{3} \cos(110^\circ)}_{-\frac{\mu}{\nu}} \underbrace{\sin(143^\circ)}_{\frac{\nu}{\mu} - 27} - \sqrt{2} \sin(138^\circ) \underbrace{\cos(153^\circ)}_{\pi - 27} =$$

$$\rightarrow \frac{\mu}{\nu} \cos 27 + \cos 27 = \frac{2}{\nu} \cos 27^\circ \Rightarrow \boxed{\frac{2}{\nu} \text{ برابر}}$$

$$f(x) = 14 \cos^2(3x) \cos^2(4x) \cos^2(11x) \cos^2(14x) \quad f\left(\frac{\pi}{34}\right) = ? \quad \text{سوال 7}$$

$$\rightarrow f\left(\frac{\pi}{34}\right) = 14 \cos^2\left(\frac{3\pi}{34}\right) \cos^2\left(\frac{4\pi}{34}\right) \cos^2\left(\frac{11\pi}{34}\right) \cos^2\left(\frac{14\pi}{34}\right) =$$

$$14 \cos^2\left(\frac{\pi}{17}\right) \cos^2\left(\frac{2\pi}{17}\right) \cos^2\left(\frac{\pi}{3}\right) \cos^2\left(\frac{2\pi}{17}\right) =$$

$$(14 \times \frac{1+\sqrt{3}}{2}) \left(\frac{1}{2}\right) \left(\frac{1}{2}\right) \left(\frac{1}{2}\right) = \boxed{\frac{3 + (1+\sqrt{3})}{14}}$$

$$n \text{ اسی کے لیے} = \text{مربع} \quad \frac{1 - \sin n}{1 + \sin n} = f \quad \tan \frac{n}{\nu} = ? \quad 1 - \sin n = \frac{\sin \frac{\nu}{2} + \cos \frac{\nu}{2}}{2 \sin \frac{\nu}{2} \cos \frac{\nu}{2}} \quad \text{سوال 4}$$

$$\frac{1 - \sin n}{1 + \sin n} = \left( \frac{\sin \frac{n}{\nu} - \cos \frac{n}{\nu}}{\sin \frac{n}{\nu} + \cos \frac{n}{\nu}} \right)^2 = f^2 \Rightarrow -\mu \cos \frac{n}{\nu} = \sin \frac{n}{\nu} \Rightarrow \tan \frac{n}{\nu} = -\mu$$

$$\frac{\sin \theta}{1 - \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = k \cot \frac{\theta}{\nu} \quad k = ? \quad \text{سوال 4}$$

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

$$\nu \cot \frac{\theta}{\nu} \Rightarrow \nu \cot \frac{\theta}{\nu} = k \cot \frac{\theta}{\nu} \Rightarrow \boxed{k = \nu}$$

$$a \text{ اسی کے لیے} = \text{مربع} \quad \sin a = \frac{\sqrt{2}}{10} \quad \cos\left(\frac{11\pi}{10} + a\right) = ? \quad \text{سوال 10}$$

$$\hookrightarrow \cos a = \frac{-\nu}{2\sqrt{2}}$$

$$\cos\left(\frac{11\pi}{10} + a\right) = -\frac{\sqrt{2}}{\nu} \cos a - \frac{\sqrt{2}}{\nu} \sin a = -\frac{\sqrt{2}}{\nu} (\cos a + \sin a) =$$

$$-\frac{\sqrt{2}}{\nu} \left( \frac{-\nu}{2\sqrt{2}} + \frac{1}{2\sqrt{2}} \right) = \boxed{\frac{4}{10}}$$