

$$a, \dots, \overline{t_r}, \dots, b \rightarrow A \cdot P - \frac{\sum x_i}{4} \geq \frac{4}{\sum \frac{1}{x_i}}$$

$$A \cdot P \cdot \frac{1}{a}, \dots, \frac{1}{\overline{t_r}}, \dots, \frac{1}{b} \quad \overline{t_r} = a + (r-1) \left(\frac{b-a}{n-1} \right) = \frac{(n-r)a + (r-1)b}{n-1} \quad \sum x_i, \sum \frac{1}{x_i} \geq 16$$

$$\overline{t}_{n-r+1}^1 - \overline{t}_r = ab \quad -P = \sum x_i$$

$$\frac{1}{\overline{t}_{n-r+1}} = \frac{1}{a} + (n-r) \left(\frac{1}{b} - \frac{1}{a} \right) = \frac{(n-r)(a-b)}{(n-1)ab} + \frac{1}{a} = \sum \frac{1}{x_i} \quad 1-r = \sum x_i$$

$$\frac{(r-1)b + (n-r)a}{(n-1)ab} = \frac{(n-r)(a-b) + (n-1)b}{(n-1)ab}$$

$\cancel{(n-r)(a-b) + (n-1)b} \geq \cancel{S(16)}$
 $\cancel{(n-1)ab} \quad r = S \left(\sum \frac{1}{x_i} \right)$

$x_1^4 + p x_1^3 + q x_1^2 + r x_1 + s = 0 \quad \begin{cases} x_1 \\ x_2 \\ x_3 \\ x_4 \end{cases}$
 $x_1 x_2 x_3 x_4 = S \quad \begin{cases} x_1 \\ x_2 \\ x_3 \\ x_4 \end{cases}$

$$\frac{\alpha \cdot \beta}{\gamma} + \frac{1}{\beta} + \frac{1}{\alpha} = -\frac{54}{27} = -2$$

$$2000x^3 - \frac{9}{x^3} + 100x^2 + \underbrace{\frac{1}{x^2}}_{c=7} + 10 = 0 \quad \beta = -\frac{3}{2}$$

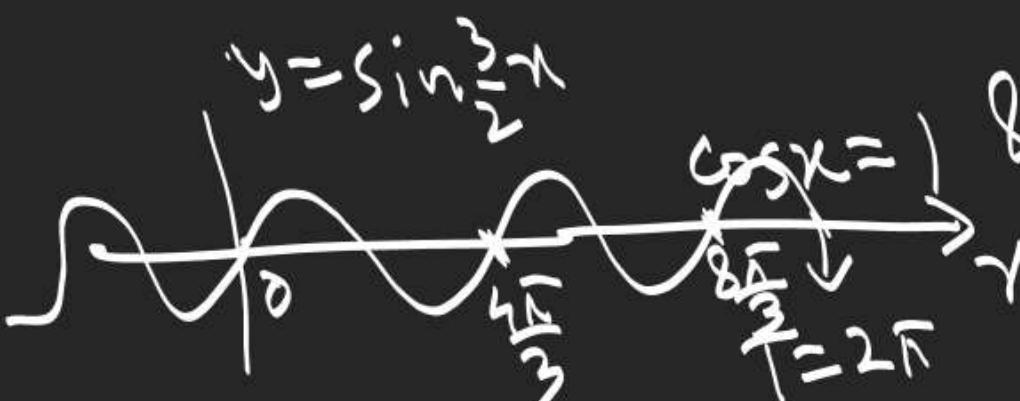
$$2\left(\left(10x - \frac{1}{x}\right)^3 + 30\left(10x - \frac{1}{x}\right)\right) + \left(\left(10x - \frac{1}{x}\right)^2 + 20\right)t^{10} = (2x+3)($$

$$2t^3 + t^2 + 60t + 30 = 0 \quad 2\left((10x^2)^3 - 1^3\right) + x\left(100x^4 + 10x^2 + 1\right)$$

$$(t^2 + 30)(2t + 1) = 0 \quad \therefore (100x^4 + 10x^2 + 1)(20x^2 - 2 + x) = 0.$$

$$\begin{aligned}1^3 + 2^3 + \dots + 9^3 - 2 \left(2^3 + 4^3 + 6^3 + 8^3 \right) \\(1^3 + \dots + 9^3) - 16 \left(1^3 + 2^3 + 3^3 + 4^3 \right) \\ \left(\frac{9 \times 10}{2} \right)^2 - 16 \left(\frac{4 \times 5}{2} \right)^2\end{aligned}$$

$$\text{L} \cdot \cos x + \cos 2x + \cos 3x = 3$$



$$f(x) = \sin \frac{3}{2}x$$

$$T = \frac{2\pi}{3/2}$$

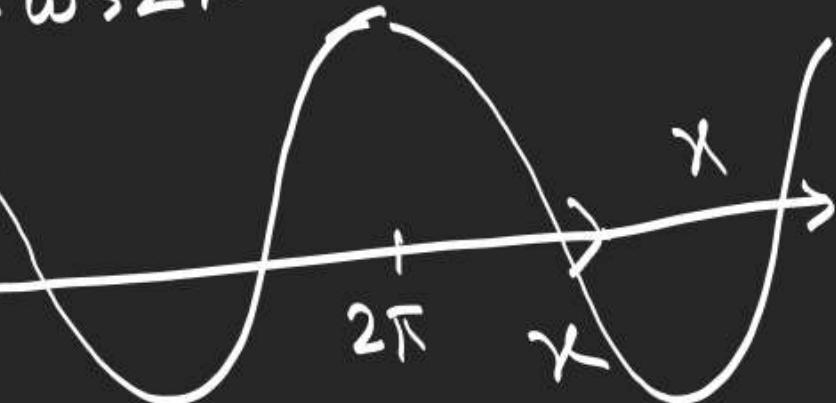
$$= \frac{4\pi}{3}$$

$$\cos x = 1 \quad \& \quad \cos 2x = 1 \quad \& \quad \cos 3x = 1$$

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

$$y = \cos 2x$$

$$y = \cos 2x$$



$$y = f(x) \rightarrow T$$

$$y = \cos 3x$$

$$y = f(kx) \rightarrow \frac{T}{k}$$

$$2x = 0 \rightarrow 2\pi$$

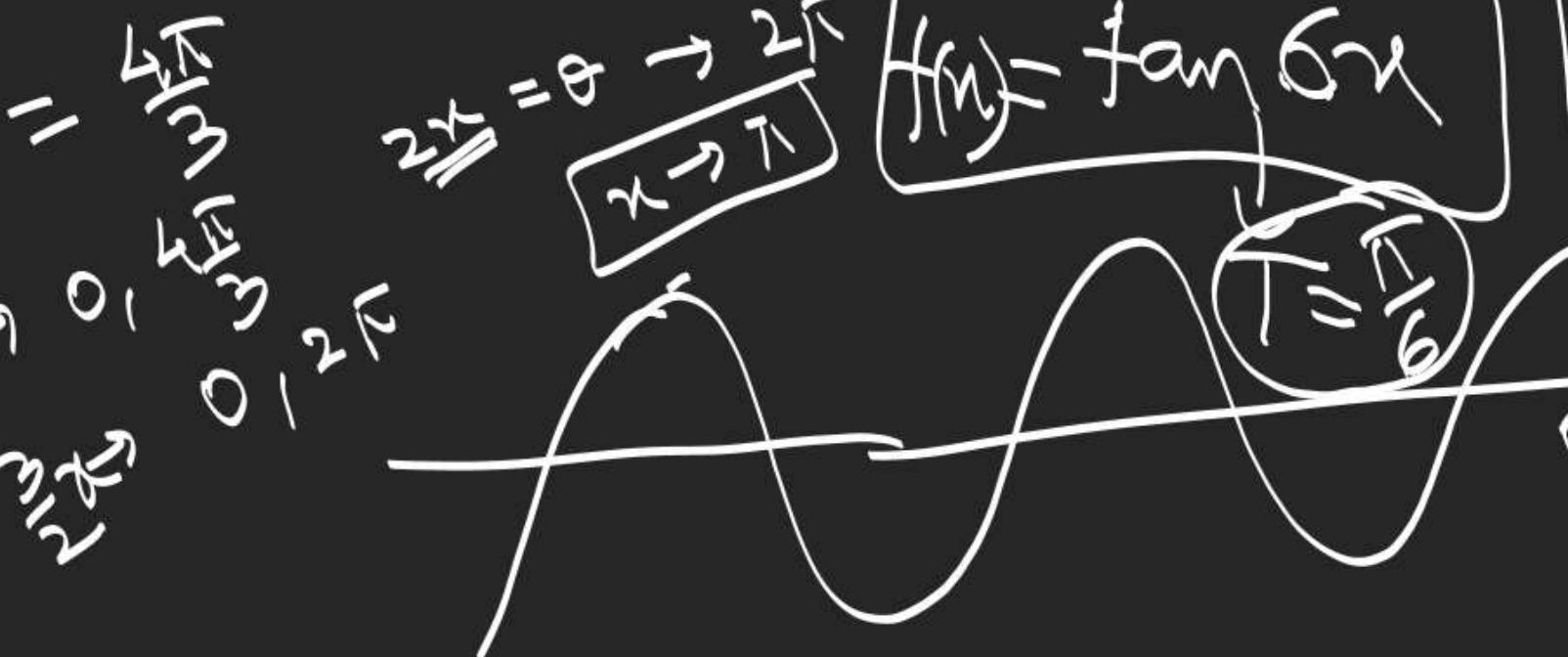
$$x \rightarrow \pi$$

$$H(x) = \tan 6x$$

$$2x = 0 \rightarrow 2\pi$$

$$x \rightarrow \pi$$

$$H(x) = \tan 6x$$



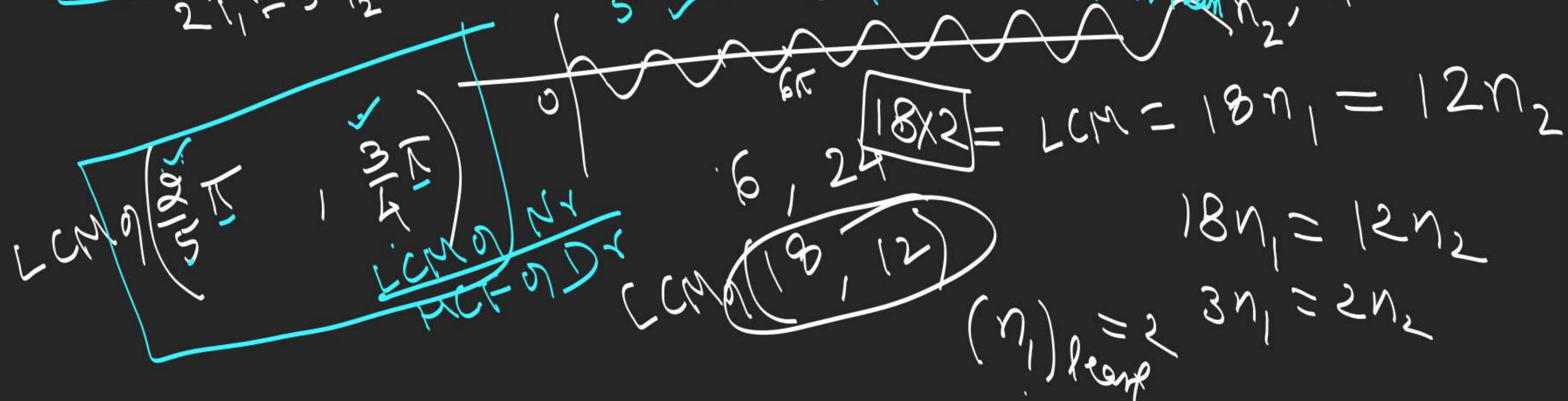
$$T = \frac{\pi}{6}$$

$$\left. \begin{array}{l} f_1(n) \rightarrow T_1 \\ f_2(n) \rightarrow T_2 \end{array} \right\} \text{common length of repetition} = 2T_1 = 5T_2 = \text{LCM of } T_1, T_2$$

$$f_1 \rightarrow T_1, 2T_1, 3T_1, 4T_1, 5T_1, \dots$$

$$f_2 \rightarrow T_2, 2T_2, 3T_2, 4T_2, 5T_2, 6T_2, 7T_2, \dots$$

$$\boxed{6\pi} = \frac{2}{5}\pi \times 15 = \text{LCM} = \frac{2}{5}\pi n_1 = \frac{3}{4}\pi n_2 \Rightarrow \frac{8n_1}{(n_1)_{\text{lcm}}} = 15n_2 \quad n_1, n_2 \in \mathbb{N}$$



$$\cos x + \cos 2x + \cos 3x = 3$$

$$\cos x = 1 \quad \text{and} \quad \cos 2x = 1 \quad \text{and} \quad \cos 3x = 1$$

$\downarrow \qquad \downarrow \qquad \downarrow$

$$2\pi \qquad \pi \qquad \frac{2\pi}{3}$$

$$T = 2\pi$$

$$[0, 2\pi) \qquad x = 0$$

$x = 2n\pi + 0, n \in \mathbb{I}$

$$2 \cdot \sin x \left(\cos \frac{x}{4} - 2 \sin x \right) + \left(1 + \sin \frac{x}{4} - 2 \cos x \right) \cos x = 0$$

$$\sin \frac{5x}{4} - 2 + \cos x = 0$$

$$x \in [0, 8\pi)$$

$$0, 2\pi, 4\pi, 6\pi$$

$$\sin \frac{5x}{4} + \cos x = 2$$

$$\sin \frac{5x}{4} = 1 \quad \& \quad \cos x = 1$$

$$T = 2\pi$$

$$T = \frac{8\pi}{5}$$

$$(\frac{5\pi}{4})_n = 8\pi - \frac{\pi}{2}$$

$$\frac{2\pi}{5\pi/4}$$

$$\text{LCM} = \frac{8\pi}{5} n_1 = 2\pi n_2 = \frac{8\pi}{5} \times 5 = 8\pi$$

$$4n_1 = 5n_2$$

$$(n_1)_{\min} = 5$$

$$x = 8n\pi + 2\pi, n \in \mathbb{I}$$

3. Solve for x & y satisfying the eqn:

$$2 - (x+1)^2 = 1 - 2x - x^2 = \tan^2(x+y) + \cot^2(x+y)$$

≤ 2

≥ 2

$x = -1, y = n\pi + 1 \pm \frac{\pi}{4}, n \in \mathbb{I}$

$(-1, 2)$

$$x = -1 \quad \& \quad \tan^2(x+y) = 1$$

$$\tan^2(y-1) = 1$$

$$y-1 = n\pi \pm \frac{\pi}{4}$$

3:

$$\sqrt{1-\cos x} = \sin x$$

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

$$1-\cos x = 0 \quad \text{or} \quad 1+\cos x = 1$$

$$\cos x = 1, \quad \cos x = 0$$

$$-\frac{\pi}{2} \neq \frac{\pi}{2}$$

$$b = -b$$

$$\cos x = 1$$

$$\cos x = 0 \quad \& \quad \sin x = 1$$

$$\left\{ x = \frac{\pi}{2} (6-10) \right.$$

$$\left. \left\{ x = \frac{\pi}{2} (11-28) \right. \right\}$$

$$x = 2n\pi + \frac{\pi}{2}, 2n\pi, n \in \mathbb{I}$$