

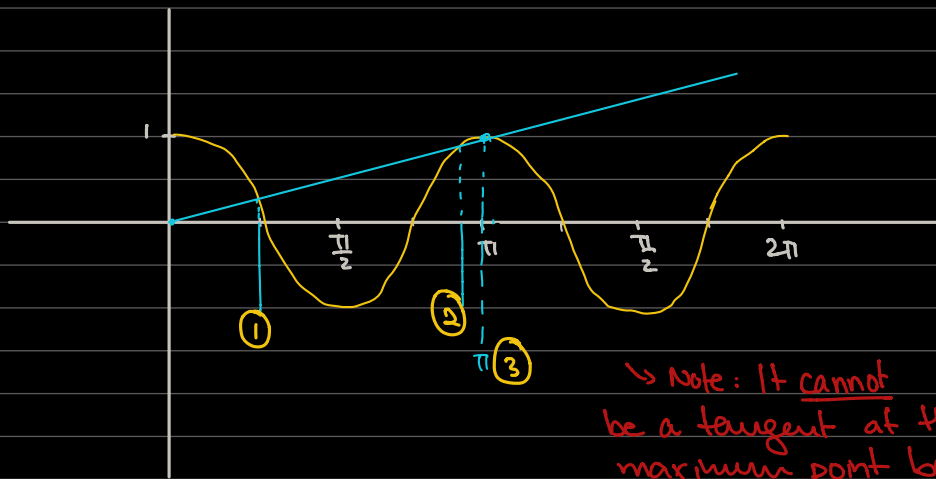
Sketching multiple functions on one graph

Q3. from 6Clamroom ws.

$$y = \cos 2x$$

$$0 \leq x \leq 2\pi$$

$$y = \frac{x}{\pi}$$



$$x = \pi \cos 2x$$

$$\cos 2x = \frac{x}{\pi}$$

$$\pi \cos 2x = x$$

↓
intersection
of both graphs

→ Note: It cannot
be a tangent at that
maximum point bc. tangents at
max points of curve are horizontal
lines.

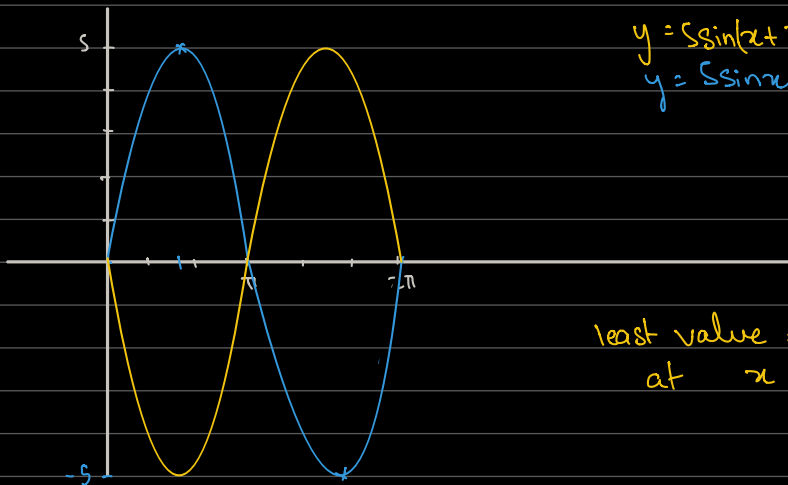
only had to state how many solutions

Ans → 3 solutions

Q4. $y = 5 \sin(x + \pi)$ for $0 \leq x \leq 2\pi$

State least value and x at which it occurs

← shift π towards left

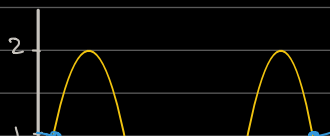


$$y = 5 \sin(x + \pi)$$

$$y = 5 \sin x$$

least value = 5
at $x = \frac{\pi}{2}$

Q5. $y = \cos 2x$ and $y = 2 \sin 3x$ for $0 \leq x \leq \pi$



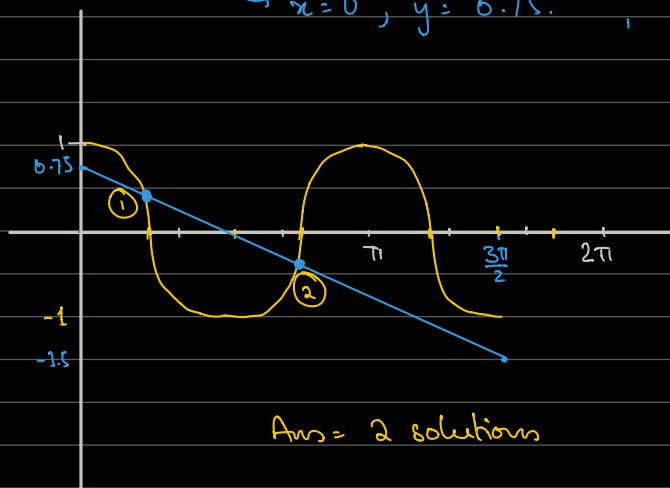
$$y = \cos 2x$$

$$y = 2 \sin 3x$$



Q7. $y = \cos 2x$, $y = \frac{3}{4} \left(1 - \frac{2x}{\pi} \right)$ for $0 < x < \frac{3\pi}{2}$

$\hookrightarrow x=0, y=0.75$, when $x = \frac{3\pi}{2}$



Ans = 2 solutions

$$\begin{aligned} & \frac{1 - 6\pi}{2} \\ & \frac{\quad}{\pi} \\ & = \left(1 - \frac{6\pi}{2\pi} \right) \\ & = (1 - 3) \\ & = -2 \\ & = \frac{-6}{4} \\ & = -1.5 \text{ at} \\ & x = \frac{3\pi}{2} \end{aligned}$$

$$\cos 2x = \frac{3}{4} \left(1 - \frac{2x}{\pi} \right)$$

$$\cos 2x = \frac{3}{4} \left(\frac{\pi - 2x}{\pi} \right)$$

$$\cos 2x = \frac{3\pi - 6x}{4\pi}$$

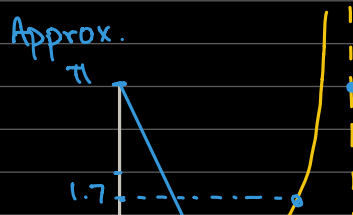
$$\frac{4\pi \cos 2x}{\pi} = \frac{3\pi - 6x}{\pi}$$

$$4 \cos 2x = 3 - \frac{6x}{\pi}$$

$\frac{6x}{\pi} + 4 \cos 2x = 3 \rightarrow$ shows that the equation in the question is simply the intersection of the two functions that we had to sketch.

Q1. $y = \tan x$, for $0 < x < \frac{\pi}{3}$ $\tan x = \pi - 2x$

$$\begin{aligned} y &= \tan x \\ \tan x &= \pi - 2x \\ y &= \pi - 2x \end{aligned}$$



$$\frac{\pi}{3} = 60^\circ$$

$$y = -2x + \pi$$

$$\text{at } x=0$$

$$y = \pi$$

$$\text{at } x = \pi$$

$$y = -\pi$$

