

Optional Fun Question

This is optional, but if you turn in the solution of this problem on test day (16th Nov), I will replace up to 5 lowest homework grades with full marks (the number of homeworks replaced will depend on the level of completion), i.e. partial solutions are welcome.

$$f(x) = \sin^2(wx) + \sqrt{3} \sin(wx) \sin\left(\frac{\pi}{2} + wx\right) \quad w > 0$$

1. If the period of $f(x)$ is π , compute value of w .
2. Compute ALL intervals where $f(x)$ is increasing.
3. Compute the maximum and minimum value of $f(x)$ inside $I = [0, \frac{3\pi}{2}]$.
Give one value of x where $f(x)$ is at its maximum/minimum in I .
Write down the range of $f(x)$ inside I .