

1. (a) Show that the only roots of the C function on $[0, 2\pi]$ are $\frac{\pi}{2}$ and $\frac{3\pi}{2}$.
(b) Show that C is periodic with period 2π .
2. Show that $3 \leq \pi \leq 2\sqrt{6} - 2\sqrt{3}$. (Hint use $C(x)$)
3. (a) Show that S has roots when $x = k\pi$ where $k \in \mathbb{Z}$.
(b) Show these are the only roots of S . (Hint spend some time thinking about this and use the greatest integer function).