Problem 1. If $g(2) = 8$ and $g'(x) \geq 3$ for every $x \in [2, 6]$, how small can $g(6)$ possibly be?

Problem 2. Find and classify all local extrema of $f(x) = \cos^2(x) - 2\sin(x)$ on $0 \leq x \leq 2\pi$. 