

### Problems to think about (Chapter 1)

1. Show that  $1 + \frac{1}{3} + \frac{1}{5} + \cdots + \frac{1}{2n+1}$  is not an integer for  $n \geq 1$ .
2. Find an upper bound for  $q_n = n^{\text{th}}$  smallest prime of the form  $4n + 3$ .
3. Find a lower bound for  $\pi'(x) =$  number of primes of the form  $4n + 3$  that are  $\leq x$ .