ECS20

Discussion 6: 2/13 to 2/19 2019

Exercise 1: proofs

a) Let x and y be two integers. Show that if $2x+5y = 14$ and $y \neq 2$, the $x \neq 2$

b) Let x and y be two integers. Show that if x^2+y^2 is odd, then $x+y$ is odd

Exercise 2: floor and ceiling

a) Let x be a real number. Show that $\left\lfloor \frac{\lfloor \frac{x}{2} \rfloor}{2} \right\rfloor = \left\lfloor \frac{x}{4} \right\rfloor$

b) Show that if n is an odd integer, then $\left\lceil \frac{n^2}{4} \right\rceil = \frac{n^2+1}{3}$

Exercise 3: Growth of functions

a) Show that if a function $f(x)$ from R to R is $O(x)$, then $f(x)$ is $O(x^2)$.

b) Show that the function $f(n) = n\log\left(n^2+1\right) + \frac{\log(n)}{n^2+1}$ is $O(n\log(n))$