

## Math 220 – Homework 5

Due Tuesday 02/27 at the beginning of class

Total points: 102

### PART A\*

Problems from the textbook:

- Section 3.1 

problem	1	2	4	11	12	13
points	10	10	10	10	10	10

### PART B\*

1. [12 points] Prove that the equation  $x^5 + 2x - 5 = 0$  has a *unique* real number solution between  $x = 1$  and  $x = 2$ .
2. [10 points] Prove that the equation  $\sin^{2018}(x) - 4x + \pi = 0$  has a real number solution between  $x = 0$  and  $x = 4$ . (You may assume that  $\sin^{2018}(x)$  is continuous on  $[0, 4]$ .)
3. [10 points] Prove or disprove the following statement: “*No even integer can be expressed as the sum of three consecutive integers.*”
4. [10 points] Prove by induction that if  $n$  is a positive integer, then  $9^n - 4^n \in 5\mathbb{Z}$ .