

Math 220 – Homework 11

Due at the beginning of Final Exam.

PART A

Problems from the textbook:

- Section 6.2 # 1(a,b), 3
- Section 6.3 # 3, 11

PART B

1. Let $a = 255$ and $b = -143$
 - (a) [6 points] Use the Euclidean Algorithm to determine $\gcd(a, b)$.
 - (b) [6 points] Find integers x and y such that $ax + by = \gcd(a, b)$.
2.
 - (a) Write the integer 42750 in a compact standard form.
 - (b) Determine the following, representing your answer in the compact standard form:

$$\gcd(2^{2018} \cdot 3^4 \cdot 55 \cdot 7^2, 6 \cdot 3^2 \cdot 77)$$

3. Prove that if p is a prime number greater than 3, then p is of the form $3k + 1$ or $3k + 2$.
4. Prove that if p is a prime number, then $\sqrt[n]{p}$ is irrational for every integer $n \geq 2$.
5. Prove or disprove that 3 is the only prime number of the form $n^2 - 1$.
6. Prove that if a is a positive integer of the form $3n + 2$, then at least one prime divisor of a is of the form $3n + 2$.