



Discrete Math
Problem-Set #9
Spring 2019

- For $a = 388$ and $b = 915$,
 - Compute $\gcd(a, b)$.
 - Find values of x and y such that $ax + by = \gcd(a, b)$.
- In \mathbb{Z}_{13} , find $3 \oplus 8$, $3 \ominus 8$, $3 \otimes 8$, and $3 \oslash 8$.
- Compute the following modulo inverses:
 - 2^{-1} in \mathbb{Z}_{15}
 - 14^{-1} in \mathbb{Z}_{53}
 - 4^{-1} in \mathbb{Z}_{230}
- When does $a \oslash b$ in \mathbb{Z}_n have a real solution? When does a^{-1} in \mathbb{Z}_n have a real solution?
- Find all values of x such that:
 - $3x \equiv 2 \pmod{17}$.
 - $3x \equiv 1 \pmod{10}$.
 - $5x + 2 \equiv 0 \pmod{11}$.
 - $10x + 25 \equiv 0 \pmod{215}$.
- Compute the following:
 - $13^{682} \pmod{7}$
 - $2^{70} + 3^{70} \pmod{13}$
 - $2^{25} \pmod{641}$.
- Determine the last two digits of $229^{10} + 37^{10}$.
- Prove that there does not exist any pair of integers x and y such that $x^2 + y^2 = 999999$.

PILOT Learning - Tip of the Week

The more self-related or wild your notes are, the easier it is to remember them. Adding references to TV shows, memes, and other visuals to your study guides will stimulate your brain and help you to remember. Visual note-taking is a great way to connect (previously unseen dots). Use text, shapes, frames, connectors and symbols. Google “visual note-taking” for examples.