

Quiz 2

Student ID Number:

Name _____

Math 173A, 3PM

Please justify all your answers

October 10, 2019

Please also write your full name on the back

1. Fill in the blank or answer with “True” or “False”.

- (a) True or False? Let n be an integer. Then every nonzero element a in $\mathbb{Z}/n\mathbb{Z}$ has a multiplicative inverse.
- (b) The highest power of a prime p dividing an integer n is called the _____ of p in n .
- (c) True or False? $(\mathbb{Z}/n\mathbb{Z})^\times$ contains $\phi(n)$ elements, where ϕ is the Euler totient function.

2. (a) Solve $7x \equiv 5 \pmod{11}$.

- (b) Let $\{p_1, p_2, \dots, p_r\}$ be a set of prime numbers, and let $N = p_1 p_2 \cdots p_r + 1$. Prove that N is divisible by some prime not in the original set. Use this fact to deduce that there must be infinitely many prime numbers.