Quiz #2

MATH 311 — Intro to Number Theory
Thursday, Oct 24

Please print your name:

Problem 1. (3 points) What is the last (decimal) digit of 7^{123456}?

Problem 2. (9 points)

(a) Among the numbers $1, 2, ..., 54$, how many are coprime to 54?

(b) If $n = p^2 q$, for distinct primes p, q, then $\phi(n) =$.

(c) How many solutions does the congruence $x^2 \equiv 4 \pmod{105}$ have?

(d) How many solutions does the congruence $x^2 \equiv 4 \pmod{210}$ have?

(e) How many solutions does the congruence $x^2 \equiv 4 \pmod{3135}$ have? $(3135 = 3 \cdot 5 \cdot 11 \cdot 19)$

(f) The multiplicative order of $3 \pmod{11}$ is .

(g) The primitive roots modulo 7 are .

(h) If $x \pmod{n}$ has multiplicative order k, then x^{2019} has multiplicative order .

(i) What is the number of invertible residues modulo 75?

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