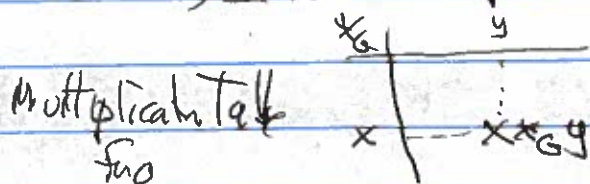


Math 417 - Test 1 - Topics for Review - 2/18/19

1. Exam is 2/22/19 in class. Closed book/notes except for 3" x 5" card. No calculator. Sections in Fraleigh are \S 4, 5, 6, 8 and the material from Hw 1-4, except order of permutations.

2. Vocabulary: commutative, associative, integers, divisibility, congruence mod n , primes, prime factorization, definition of group (closed, identity, inverse), subgroup, cyclic group, isomorphism, permutation, subgroup generated by $a \in G$

3. Notation: $\mathbb{Z}, \mathbb{Q}, m|n, a \equiv b \pmod{n}, \nu_p(n), \gcd(m, n)$
 $(\mathbb{Z}/n\mathbb{Z}, +), ((\mathbb{Z}/n\mathbb{Z})^*, \cdot), \langle a \rangle$ for $a \in G, \cong$ for isomorphism.
 $|G| = \text{order of } G = \# \text{ elements in } G$



4. Groups to know: $(\mathbb{Z}/n\mathbb{Z}, +)$ - isomorphic to the cyclic group of order n - C_n ; $((\mathbb{Z}/n\mathbb{Z})^*, \cdot)$ - structure in general more complicated
 $V =$ Klein 4 group, $S_3 =$ symmetric group on $\{1, 2, 3\}$

5. Theorems to know: Euclidean algorithm, determining whether $H \leq G$ is actually a subgroup, subgroups of cyclic groups and the connection with gcd. How to multiply permutations

6. Not on this test: $\phi(n)$, repeating decimals as such, Lagrange's Theorem, Cayley's Theorem, calculating the order of a general permutation