

Midterm Exam #2

Math 263

October 14, 2002

Name _____

Do all of your work on the blank paper provided. At the end of the exam, hand in your answers with this cover sheet. Include your name on all pages of your exam.

§1 Calculation

- Calculate:
 - $36 \div 7$
 - $36 \bmod 7$
- Determine if the number is rational. If it is rational, write it as a ratio of two integers.
 - $0.5858585858\dots$
 - $20.492492492\dots$
- Write 3,300 in standard factored form.

§2 Comprehension

- What is the definition of a prime number? What is the definition of a composite number?
- State precisely the Quotient-Remainder Theorem.

§3 Application

- Prove or disprove: The product of odd integers is odd.
- Prove or disprove: If n^2 is even, then n is even.
- Prove or disprove: If n is an odd integer, then $n^4 \bmod 16 = 1$.
- Prove or disprove: There are an infinite number of primes.
- Prove or disprove: $120 \mid (n^5 - 5n^3 + 4n)$ for any positive integer n .