

FA(Algebra)Qs Math 5900, Fall 2011

**A. Basic Stuff.**

- A1. Why can't you divide by zero?
- A2. Why is the product of two negative numbers a positive number?
- A3. What is the best way to find the gcd of two natural numbers?
- A4. What are you allowed to do to an equation when solving for  $x$ ?
- A5. How do you solve multiple linear equations in multiple variables?

**B. Prime and Composite Numbers.**

- B1. Why isn't 1 a prime number?
- B2. How do we know that prime numbers go on forever?
- B3. How would you prime factorize a composite number?

**C. Rational and Irrational Numbers.**

- C1. What is a real number? When is it rational?
- C2. What are (infinite) decimals, and is it true that  $0.999\dots = 1$ ?
- C3. How do we add and multiply rational numbers?
- C4. When is a square root of a rational number again rational?
- C5. Are  $e$  and  $\pi$  rational? What do they have to do with algebra?
- C6. What are the complex numbers?

**D. Polynomials.**

- D1. How do you multiply and divide polynomials (with remainders)?
- D2. What is the binomial theorem? What is Pascal's Triangle?
- D3. Why does a polynomial of degree  $d$  have no more than  $d$  roots?
- D4. Does every polynomial have a complex root?

**E. Rational Functions.**

- E1. What is a rational function and how do you graph it?
- E2. Why should we care about rational functions?

**F. Exponentials and Logarithms.**

- F1. What is the common log? Natural log?
- F2. What are the rules for exponents and corresponding rules for logs?
- F3. How would you use your calculator to find  $\log_a b$ ?