# Discuss Questions Section 1.3

1. What is the definition of prime integer?
    a. Any reading notes to share?
    b. Easy to demonstrate non-primeness
    c. Harder to demonstrate primeness. Is 17 prime? How can we be sure?
    d. Can we define the concept of primeness for rationals? Reals?

2. Theorem 1.8
    a. Reference to Theorem 1.5. Did anyone go back and review that while reading?
    b. Statement: For integer *p* not equal to 0, 1, or -1. *p* is prime iff ______
    c. What are *b* and *c* here? Positive? Nonzero? Any integers?
    d. Structure of proof? Should be two directions, but only one is given. Did anyone try to prove the missing direction? What will the general structure be?
    e. If you go very far down the road to a proof you find yourself with situations where $a \mid b \mid a$. What would that imply? Do we have any previous results about this sort of situation?

3. Corollary 1.9
    a. What does it say?
    b. This is a common result: statement true for two elements is often also true for any finite number of elements.
    c. What kind of numbers must the $a_i$ be?
    d. Proof by induction.

4. Theorem 1.10
    a. Every integer except -1,0,1 is a product of primes. This is a major tool of number theory. Here we will see a rigorous proof. Did you see one in an earlier class?
    b. Good strategy: try to prove it yourself. What would a proof look like?
    c. Simpler problem: prove every integer except -1, 0, 1 is divisible by some prime. Restatement: every integer other than -1,0,1 is either itself a prime, or is divisible by a prime. Use (strong) induction.

5. Fundamental Theorem of Arithmetic
    a. What does it say?
    b. What does the corollary say?
    c. It is a common thing to write prime factorizations with exponents. For example $280 = 10 \cdot 28 = 2 \cdot 5 \cdot 4 \cdot 7 = 2^3 \cdot 5 \cdot 7$. Is there a version of the FToA that uses that notational convention?