Last name _____

First name _____

LARSON—MATH 353–CLASSROOM WORKSHEET 02
Primes.

1. What is $\mathbb{Z}$?

Def. If $a, b \in \mathbb{Z}$ we say that a divides b, written $a \mid b$, if $ac = b$ for some $c \in \mathbb{Z}$. In this case, we say a is a *divisor* of b. We say that a does not divide b, written $a \nmid b$, if there is no $c \in \mathbb{Z}$ such that $ac = b$.

2. What are some examples?

3. What is a *prime* integer $n > 1$?

4. What is a *composite* integer?

5. What is $\gcd(a, b)$ for integers a, b?

6. Why does $\gcd(a, b) = \gcd(b, a)$?

7. Why does $\gcd(a, b) = \gcd(\pm a, \pm b)$?

8. Why does $\gcd(a, b) = \gcd(a, b - a)$?

(**Lemma 1.1.10**) Suppose $a, b, n \in \mathbb{Z}$. Then $\gcd(a, b) = \gcd(a, b - an)$.

9. Why is Lemma 1.1.10 true?

(**P**roposition 1.1.11. Suppose that a and b are integers with $b \neq= 0$. Then there exists unique integers q and r such that $0 \leq r < |b|$ and $a = bq + r$.

10. Why is Proposition 1.1.11 true?