Last name _____

First name _____

LARSON—MATH 353–HOMEWORK WORKSHEET 02

1. Compute the greatest common divisor $\gcd(455, 1235)$ using Algorithm 1.1.13 from our text. Explain.

2. (a) Let $y = 10000$. Compute $\pi(y) = \#\{\text{primes } p \leq y\}$.
   (b) The prime number theorem implies $\pi(x)$ is asymptotic to $\frac{x}{\log(x)}$. How close is $\pi(y)$ to $\frac{y}{\log(y)}$, where y is as in (a)?

3. Let a, b, c, n be integers. Prove that (a) if $a|n$ and $b|n$ with $\gcd(a, b) = 1$, then $ab|n$.
   (b) if $a|bc$ and $\gcd(a, b) = 1$, then $a|c$.

   The point here is to wrestle with the kind of arguments we've been making in class. You will need to use our formal definition of *divides*.