MATH. 104A, SAMPLE MIDTERM

You have 50 minutes for this exam. Please write legibly. No calculators are allowed.

(1a) (2 points) Give the definition of a prime number.

(b) (5 points) Show that if $n > 1$ is composite, then $n$ has a prime divisor which is $\leq \sqrt{n}$.

(c) (2 points) Show that 137 is prime.

(2a) (6 points) Use Euclid’s algorithm to find $gcd(221, 289)$.

(b) (6 points) Find all integer solutions to $221x + 289y = 153$.

(3) Are the following true or false? Prove your assertion.

(a) (3 points) If $a$, $b$ and $c$ are 3 non-zero integers, then $GCD(a, b, c) = GCD(a, GCD(b, c))$.

(b) (3 points) If $a^2$ and $b^2$ are relatively prime, so are $a$ and $b$.

(c) (3 points) $5\sqrt{6}$ is irrational.