Home work 2

Due Feb 9

20 points

1.(4 Points) Prove that if a divides m and a divides n then a divides $pm + qn$ for all integers p and q.

2. (4 points) Prove that if m is relatively prime to p and q, then m is relatively prime to pq.

3. (6 points) a. Prove that all prime numbers greater than 3 must be of the form $6n + 1$ or $6n + 5$.

b. Prove that the set of all prime numbers of the form $6n + 5$ must be infinite.

c. Is the set of primes of the type $6n + 1$ also infinite? Would a similar argument as in b (changing 5 to 1) prove this? Why?

4. (6 points) S is the set of all numbers of the form $4n + 1$ where $n \geq 1$. We call a number $S - prime$ if it is not divisible by any number in S other than itself.

Prove or Disprove:

a. There are infinitely many S -primes .

b. Every number in S can be written as a finite product of S primes.

c. Every number in S can be written uniquely as a finite product of S primes.