

Math 311 Homework 3 Fall 09 due September 17

1. Number 8 on page 38.

2. Number 4 on page 43.

3. Let a , b and c be non-zero integers. The greatest common divisor of a , b , c , denoted $\gcd(a, b, c)$, is the greatest integer that divides a , b and c . Show that the $\gcd(a, b, c) = \gcd(a, \gcd(b, c))$.

4. (a) Show that $35x + 125y = 123456$ has no integer solution.
(b) Find all m for which $35x + 125y = m$ has integer solutions. Justify your answer.
(c) Determine **all** solutions to the equation $35x + 125y = 65$.

5. (a) Given that p is a prime and $p|a^n$, prove that $p^n|a^n$.
(b) Without using a calculator, find all primes that divide $70!$. Justify your answer.