

due Jan 31

Homework Set 3
(section 1.2 & 1.3)

Name: _____

1. Let a , b , and c be integers. If both a and b divides c , must ab divide c ? Why or why not. What if $\gcd(a, b) = 1$?

2. Let a , b , c , and d be integers. If $\gcd(a, b) = c$ and b divides ad , prove that b also divides cd .

3. Prove that $\sqrt{10}$ is irrational.

4. Let a and b be integers, and let n and m be positive integers such that $n \leq m$. If p is prime and $\gcd(a, b) = p$, prove that p^n divides $\gcd(a^n, b^m)$. Does $p^n = \gcd(a^n, b^m)$? Why or why not.

5. For the following questions, be sure to write your conclusion in a complete sentence(s).

a. Express 8,069,490 as a product of primes.

b. Find the greatest common divisor of 304 and 5985, using the Euclidean Algorithm. Use your answer to write the $\gcd(304, 5985)$ as a linear combination of 304 and 5985.