

due Jan 31

Homework Set 3  
(section 1.3 & 2.1)

Name: \_\_\_\_\_

1. Let  $a$ ,  $b$ , and  $c$  be integers. If  $c > 0$ , prove that  $\gcd(ca, cb) = c \cdot \gcd(a, b)$ .

2. Let  $a$  and  $b$  be integers. If  $p$  is prime and  $\gcd(a, b) = p$ , prove that  $\gcd(a^2, b^2) = p^2$ .

3. Express 2,042,040 as a product of primes.

4. Prove that  $\sqrt{6}$  is irrational.

5. If  $r \equiv 3 \pmod{10}$  and  $s \equiv -7 \pmod{10}$ , then what is  $2r + 3s$  congruent to modulo 10?