MATH 2320 – Discrete Mathematics — Assignment #5
Winter 2016

Instructions

- Answer each question completely; justify your answers.
- This assignment is due at 17:00 on Wednesday March 9th in Assignment Box #44.

1. Find integers q and r with $0 \leqslant r < |b|$ such that $a = qb + r$:
   (a) $a = 128$, $b = 5$
   (b) $a = -8131$, $b = 7$
   (c) $a = -9762$, $b = -19$
2. Let a and b be integers that are not both zero. Prove that $\gcd(a, a + b) = \gcd(a, b)$.
3. Let $a = 7680$ and $b = 912$. Let g be the greatest common divisor of a and b.
   (a) Find g.
   (b) Find integers m and n such that $ma + nb = g$.
4. Find integers x and y such that $154x + 260y = 4$.
5. Show that there is no integral solution to $196x + 245y = 3$.
6. Prove: if $k \in \mathbb{N}$ then $\gcd(3k + 2, 5k + 3) = 1$.
7. Find the prime decompositions for:
   (a) $n = 123456$
   (b) $n = 5050$
8. Exercise 4.3.9.
9. Exercise 4.3.26, part (b).
10. Exercise 4.3.32, parts (b) and (c).