CS 1050B: Constructing Proofs

Problem Set 7

Due Friday, Nov 20th, after the class

1. **Rosen 3.4: 16**

   Evaluate these quantities.

   a) -17 mod 2

   b) 144 mod 7

   c) -101 mod 13

   d) 199 mod 19

2. **Rosen 3.4: 22**
   Show that if a, b, c, and m are integers such that $m \geq 2$, $c > 0$, and $a \equiv b \pmod{m}$, where a and b are integers, then $a \equiv b \pmod{m}$.

3. **Rosen 3.4: 24**
   Prove that if n is an odd positive integer, then $n^2 \equiv 1 \pmod{8}$.

4. **Rosen 3.5: 20**

   What are the greatest common divisors of these pairs of integers

   a) $2^2 \cdot 3^3 \cdot 5^5$, $2^5 \cdot 3^3 \cdot 5^2$

   b) $2 \cdot 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13$, $2^{11} \cdot 3^9 \cdot 11 \cdot 17^{14}$

   c) 17 , 17^{17}

   d) $2^2 \cdot 7$, $5^3 \cdot 13$

   e) 0, 5

   f) $2 \cdot 3 \cdot 5 \cdot 7$, $2 \cdot 3 \cdot 5 \cdot 7$

5. **Rosen 3.5: 26**
   If the product of two integers is $2^7 3^8 5^2 7^{11}$ and their greatest common divisor is $2^3 3^4 5$, what is their least common multiple?