Discrete Math HW 8: Learning goals N1, N4

due Monday, April 21

N1: I can determine whether one integer is divisible by another, and calculate quotients and remainders according to the Division Algorithm.

Exercise 1 Determine which of the following divisibility relationships hold.

- $2 \mid 90$
- $3 \mid 90$
- $4 \mid 90$
- $5 \mid 10$
- $10 \mid 5$
- $10 \mid -10$
- $0 \mid 6$
- $6 \mid 0$
- $0 \mid 0$
- $247 \mid 13585$
- $(-2) \mid 4$
- $2 \mid (-4)$
- $(-4) \mid 2$

Exercise 2 List all the positive integer divisors of 60.

Exercise 3 Calculate each of the following quotients and remainders.

- 60 **div** 12
- 60 **mod** 12
- 60 **div** 7
- 60 **mod** 7
- 0 **div** 12

- 0 **mod** 12
- 12983 **div** 527
- 12983 **mod** 527
- (-25) **div** 7
- (-25) **mod** 7

N4: I can solve modular equivalences in one variable involving addition, subtraction, and multiplication by a constant.

Exercise 4 Solve each of the following equivalences for x. Express your answers in the form $x \equiv_m r$ where $0 \leq r < m$.

1. $x + 12 \equiv_7 99$
2. $27x + 27 \equiv_{13} 2727$
3. $2x - 12 \equiv_8 x + 7$
4. $77x + 15 \equiv_7 5 - 22x$