

Math 255 - Spring 2022  
Beginning congruences  
10 points

This homework is aiming to help you get more familiar with the concept of congruences, by working with concrete examples.

1. (a) Give three different positive integers that are congruent to 3 modulo 5.  
(b) Give two different negative integers that are congruent to 3 modulo 5.  
(c) Give four integers that are congruent to 3 modulo 4, and make sure that two of them are positive, and two of them are negative.
2. Give the least residue of 37 modulo 5, 6, and 7.
3. (a) Give one positive integer solution and one negative integer solution to the equation  $x + 1 \equiv 3 \pmod{4}$ .  
(b) Give one positive integer solution and one negative integer solution to the equation  $x + 1 \equiv -2 \pmod{6}$ .
4. For this problem, please feel free to use trial and error (trying each possible value for  $x$ ) or any other method you know to solve these equations.
  - (a) Find every integer  $x$ , if any, with  $0 \leq x < 10$  such that  $5x \equiv 5 \pmod{10}$ .
  - (b) Find every integer  $x$ , if any, with  $0 \leq x < 10$  such that  $5x \equiv 2 \pmod{10}$ .
  - (c) Find every integer  $x$ , if any, with  $0 \leq x < 10$  such that  $3x \equiv 5 \pmod{10}$ .
  - (d) Find every integer  $x$ , if any, with  $0 \leq x < 10$  such that  $3x \equiv 2 \pmod{10}$ .