

Instructions

- Answer each question completely; justify your answers.
- This assignment is due at 23:59 (Newfoundland time) on Tuesday March 16th.
- Submit your assignment via the D2L shell for the course.

1. Reduce a modulo n

(a) $a = 451723, n = 22$

(b) $a = (9645)(5689), n = 42$

(c) $a = (801)^{585}(751)^{3200}, n = 11$

2. Solve the following congruences:

(a) $9x \equiv 100 \pmod{431}$

(b) $16x \equiv 9 \pmod{21}$

(c) $11x \equiv 18 \pmod{43102}$

(d) $3x \equiv 25 \pmod{48}$

3. Solve the following systems of congruences:

(a) $5x - 2y \equiv 3 \pmod{11}$ and $2x + y \equiv 8 \pmod{11}$

(b) $8x - 4y \equiv 2 \pmod{23}$ and $x - 3y \equiv 7 \pmod{23}$

(c) $6x - 7y \equiv 8 \pmod{33}$ and $4x + 5y \equiv 3 \pmod{33}$

4. Solve the following system of congruences: $x \equiv 42 \pmod{67}$
 $x \equiv 73 \pmod{99}$

5. Solve the following system of congruences: $x \equiv 7 \pmod{25}$
 $x \equiv 5 \pmod{36}$
 $x \equiv 9 \pmod{41}$

6. Solve the following system of congruences: $x \equiv 2 \pmod{5}$
 $x \equiv 3 \pmod{9}$
 $x \equiv 5 \pmod{17}$
 $x \equiv 7 \pmod{49}$

7. Solve the following system of congruences: $3x \equiv 11 \pmod{13}$
 $8x \equiv 7 \pmod{29}$