Exercises: Modular arithmetic part 1

1. Which of these congruences are true?

   (a) $5 \equiv 29 \mod 12$

   (b) $33 \equiv 2 \mod 15$

   (c) $-3 \equiv 30 \mod 11$

   (d) $-2 \equiv -50 \mod 26$

   (e) $50 \equiv 24 \mod 26$

2. Write these congruences, $a \equiv b \mod m$, in the form $a = qm + b$.

   (a) $19 \equiv 4 \mod 5$;

   (b) $200 \equiv 50 \mod 15$;

   (c) $-10 \equiv 2 \mod 3$;

   (d) $-20 \equiv -6 \mod 7$;

   (e) $72 \equiv 20 \mod 26$;

3. Complete the following congruences with the smallest positive solution.

   (a) $40 \equiv \quad \mod 9$;

   (b) $312 \equiv \quad \mod 15$;

   (c) $312 \equiv \quad \mod 7$;

   (d) $-1 \equiv \quad \mod 26$;

   (e) $55 \equiv \quad \mod 26$.

4. Write three possible solutions for each of these congruences:

    (a) $2 \equiv \quad \mod 16$;

    (b) $-60 \equiv \quad \mod 26$;

    (c) $27 \equiv \quad \mod 26$.

5. Write out all the possible remainders modulo 7.