

1. Write down a multiplication table for the equivalence classes of the integers modulo 3.
2. By passing to equivalence classes modulo a judicious choice of n , solve the following problems.
 - (a) Show that $x^5 + 7x^2 + 4x + 2 = 0$ has no integer solutions.
 - (b) Show that $46^3 + 23^5 \neq 6533678$.

(c) Show that $15x - 12y = 100$ has no integer solutions.

(d) Show that if $a \in \mathbb{Z}$ then $a^2 \not\equiv 2 \pmod{4}$ and $a^2 \not\equiv 3 \pmod{4}$.