1. Let \( f : \mathbb{R} \to \mathbb{R} \) by \( f(x) = 7x - 4 \). Find a function \( g \) so that \( g \circ f(x) = x \) for all \( x \).

   Solution: The function \( g \) must add 4 to its input and then divide by 7. We get
   \[
   g(x) = \frac{x + 4}{7}.
   \]

2. Find multiplicative inverses for 2 and 3 modulo 7.

   Solution: By trial and error, we find that \( 2 \times 4 \equiv 1 \pmod{7} \) and \( 3 \times 5 \equiv 1 \pmod{7} \).

   The multiplicative inverse of 2 mod 7 is 4;
   the multiplicative inverse of 3 mod 7 is 5.

3. Solve the congruence \( 9x + 15 \equiv 10 \pmod{89} \). Find a solution in the set \( \{0, 1, 2, \ldots, 88\} \).

   (HINT: \( 9 \times 10 = 90 \).)

   Solution: We subtract 15 from both sides to get
   \[
   9x \equiv -5 \pmod{89}
   \equiv 84 \pmod{89}.
   \]

   By the hint, we know that the multiplicative inverse of 9 is 10, so we multiply both sides by 10 to get
   \[
   x \equiv 840 \pmod{89}.
   \]

   Finally, we find that \( 840 \mod 89 = 39 \).

   The solution we’re looking for is \( x = 39 \).