Worksheet 7

Math 391, Abstract Algebra

Wednesday, October 14, 2020

1. Solve the following congruences from §1.3 #20.
   (a) $3x \equiv 2 \pmod 5$.
   (b) $6x + 3 \equiv 1 \pmod{10}$.
   (c) $243x + 17 \equiv 101 \pmod{725}$.
   (d) $20x \equiv 4 \pmod{30}$.
   (e) $20x \equiv 30 \pmod 4$.
   (f) $49x \equiv 4000 \pmod{999}$.
   (g) $15x \equiv 25 \pmod{35}$.
   (h) $15x \equiv 24 \pmod{35}$.
2. If time allows, work on the following simultaneous congruences from §1.3 #21, which is part of next Monday's homework.
   (a) $x \equiv 1 \pmod 3$ and $x \equiv 1 \pmod 5$.
   (b) $x \equiv 1 \pmod 4$ and $x \equiv 7 \pmod{13}$.
   (c) $x \equiv 3 \pmod 4$ and $x \equiv 4 \pmod 5$ and $x \equiv 3 \pmod 7$.
   (d) $19x \equiv 1 \pmod{140}$. Hint: $140 = 4 \cdot 5 \cdot 7$. How can you recycle your answer to part (c)?
   (e) $x \equiv 3 \pmod 9$ and $x \equiv 18 \pmod{24}$.
   (f) $x \equiv 4 \pmod{105}$ and $x \equiv 29 \pmod{80}$.
   (g) $x \equiv 11 \pmod{142}$ and $x \equiv 25 \pmod{86}$.