MTH 309

Additional Problems for Section 4.1

1. Evaluate these quantities (recall in the textbook, $[a]_m$ is denoted by $a \mathbf{\ mod\ } m$):

   (a) $[45]_4$

   (b) $[144]_7$

   (c) $[-20]_3$

   (d) $[-101]_{13}$

2. True or False (justify your answer):

   (a) $37 \equiv 3 \pmod 7$

   (b) $73 \equiv 3 \pmod 7$

   (c) $-24 \equiv 1 \pmod 5$

   (d) $35 \equiv -5 \pmod 8$

3. Evaluate each of the following: (Recall $\oplus_m$ and $\odot_m$ are operations on elements of $\mathbb{Z}_m$. Therefore your answer should be an element of $\mathbb{Z}_7$.)

   (a) $4 \oplus_7 6$

   (b) $(4 \oplus_7 6) \oplus_7 5$

   (c) $4 \oplus_7 (6 \oplus_7 5)$

   (d) $4 \odot_7 6$

   (e) $(4 \odot_7 6) \odot_7 5$

   (f) $4 \odot_7 (6 \odot_7 5)$