1. Decide if the following are true or false.

   (a) $7 \mid -7$.

   (b) $-5 \pmod 6 = 5$.

   (c) $-1 \mid 0$.

   (d) If $a \mid b$ and $a \mid c$, then $a \mid (bc)$, where a, b, c are integers.

   (e) $8 \equiv 0 \pmod 3$.

   (f) $13 \mid 91$.

2. Find the following.

   (a) $53 \pmod 7$.

   (b) $-97 \pmod 5$.

   (c) $1{,}000 \pmod 6$.

   (d) $(-7)^{52} \pmod 8$.

   (e) $(16k - 11) \pmod 4$, where k is any integer.

3. $a = 75$, and $b = 3^m 5^n$, where $m, n > 0$. If $a \mid b$, what can you conclude about m and n?

4. Suppose you take an integer and raise it to the 4th power. What are the possible digits a 4th power can end in? Hint: Use arithmetic (mod 10).

5. Find a number n such that $n \equiv 1 \pmod{6}$ and $n \equiv 2 \pmod{5}$. Then find *every* number n with this property.