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Problem 1. (7 pts.) Marci went to get some office supplies. She decided to buy:

- 10 notebooks for $9 each;
- a few pencils for $3 each;
- 12 staplers, each for the same whole number of dollars. ($4? $15? Marci can't remember.)

The cashier told Marci that her total was $256.\footnote{For this problem, let’s ignore the tax issues.} “You’ve clearly made a mistake,” she replied immediately.

(a) Evaluate the following expressions:

(a.1) $10 \pmod{3} = 1$

(a.2) $9 \pmod{3} = 0$

(a.3) $3 \pmod{3} = 0$

(a.4) $12 \pmod{3} = 0$

(a.5) $256 \pmod{3} = 1$

(b) How did Marci spot the mistake so quickly?

Since the price of each notebook ($9), the price of each pencil ($3), and the number of staplers (12) are divisible by 3, the total must have also been divisible by 3, while $256 \pmod{3} = 1$.

Problem 2. (3 pts.) Convert the following numbers to the decimal system:

(a) $110_2 = 6$

(b) $22_3 = 8$

(c) $BA_{16} = 186$