

1. Find q, r with $0 \leq r < a$, so that $b = a \cdot q + r$ with:
 - (a) $a = 698129, b = 2232438$
 - (b) $a = 265959, b = -3221171$.
 - (c) $a = 468736, b = 46753$.
 2. Compute the following:
 - (a) $61867 \% 10013$
 - (b) $130223466 \% 537914$
 3. Without a calculator find the last digit of: $7283 \cdot 40513 + 6266 \cdot 9804 + 1696 \cdot 79884$.
 4.
 - (a) Without a calculator determine the remainder of 991479713248 when it is divided by 9.
 - (b) Is 991479713248 divisible by 9?
 5. Encipher the message “tube” using an affine cipher with key $a = 19$ and $b = 21$.
 6. (Wait until Wednesday to try this problem.) Find the inverse of 13 (mod 29) (that is, find c such that $13c \equiv 1 \pmod{29}$).
- Do one of the following two problems, you can do both for extra credit.**
7. Prove that if $a \equiv b \pmod{m}$ and c is an integer then $a + c \equiv b + c \pmod{m}$. You will use both the definition of mod and divisibility.
 8. Prove that if $d|a$ and $d|b$ then $d|a + b$ and $d|a - b$.
 9. Find the following places on campus and take a picture of yourself there and send it to me.
 - (a) The Math Learning Center
 - (b) The Logic Center
 - (c) The Writing Center