Problem 1

Show that if $a, b, c$ and $d$ are integers such that $a|c$ and $b|d$ then $ab|cd$.

Problem 2

Let $m$ be a positive integer. Show that $a \mod m = b \mod m$ if $a \equiv b \pmod{m}$.

Problem 3

What are the quotient and remainder when
a) 44 is divided by 8?
b) -123 is divided by 19?
c) 1234567 is divided by 1001?
d) -100 is divided by 101?

Problem 4

If $a * 133 - m * 277 = 1$, does this guarantee that $a$ has an inverse mod $m$?
Problem 5

Solve the following congruence equations for $x$. a) $8x \equiv 1 \pmod{13}$
b) $99x \equiv 1 \pmod{13}$