

Problem Set 5

Problem 1

Find $1942 \bmod 7$. Find $1942 \bmod 13$.

Problem 2

What is the smallest x for which $x \bmod 7 = 0$ and $x \bmod 13 = 0$?

Problem 3

My age $\bmod 7$ is 1, and my age $\bmod 13$ is 6. What is my age?

Problem 4

Find $1836542 \bmod 9$. Find $315734 \bmod 9$.

Problem 5

Find $1942 \bmod 10$. Find $1942 \bmod 100$.

Problem 6

Express 1942 in the base-7 number system ("digits" 0 through 6). Is the last "digit" the same as your answer to Problem 1?

Problem 7

Prove that $[X \times Y] \bmod n = [X \bmod n \times Y \bmod n] \bmod n$.

(Let $X = a \times n + x$, and let $Y = b \times n + y$.)

Problem 8

Calculate 1942×385 by long multiplication. To check your answer, find $1942 \bmod 9$, find $385 \bmod 9$, and find the $\bmod 9$ of your answer.