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[选做题一] 数论小练习

Let p, N be integers such that p divides N. Prove that for any integer X, [[X mod N] mod p] = [X mod p]. Show that, in contrast, [[X mod p] mod N] need not equal [X mod N].
Proof:

- let $X = aN + r$, $r = bp + t$,so $X = aN + bp + t$
- therefore $[[X \text{ mod } N] \text{ mod } p] = t = [X \text{ mod } p]$
- however $[[X \text{ mod } p] \text{ mod } N] = t$ and $[X \text{ mod } N] = r = bp + t$
- So it may not be equal