

Math 465 - Spring 2021

Homework 3

Due **Thursday** February 18th, 2021

How many times can you subtract 7 from 83, and what is left afterwards? You can subtract it as many times as you want and it leaves 76 every time.

— Unknown

- (1) If m, n are positive integers and $m|n$, show that $a \equiv b \pmod{n}$ implies that $a \equiv b \pmod{m}$, but that the converse is false.
- (2) Solve the equations $7x \equiv 3 \pmod{12}$ and $10x \equiv 6 \pmod{18}$
- (3) Show, if $a \equiv b \pmod{n}$ that $\gcd(a, n) = \gcd(b, n)$.
- (4) 4-1.5 (From the textbook).