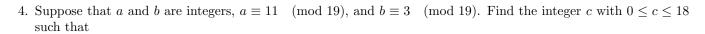
Your Name:

Duration of the Quiz is 15 minutes. There are four problems, worth 20 points. Show all your work for full credit. Books, notes etc. are prohibited. Calculators are NOT permitted.

- 1. What are the quotient and remainder when 77 is divided by 21?
- 2. What are the quotient and remainder when -1 is divided by 23?
- 3. The set of integers modulo 5, \mathbb{Z}_5 , is a group under addition modulo 5. Write out the Cayley table for \mathbb{Z}_5 , and identify the additive identity and the additive inverse of each element.



(i)
$$c \equiv 4a \pmod{19}$$

(ii)
$$c \equiv a - b \pmod{19}$$

(iii)
$$c \equiv 2a + 3b \pmod{19}$$

(iv)
$$c \equiv a + 4b^2 \pmod{19}$$