

## Mathematische Grundlagen der Informatik SS2005

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### Blatt 5, Abgabe 18.5.05

Aus Humphreys&Prest

#### Aufgabe 12

Determine which of the following are true (a calculator will be useful for the larger numbers):

$$8 \equiv 48 \pmod{14}$$

$$-8 \equiv 48 \pmod{14}$$

$$10 \equiv 0 \pmod{100}$$

$$7754 \equiv 357482 \pmod{3643}$$

$$16023 \equiv 1325227 \pmod{25177}$$

$$4015 \equiv 33303 \pmod{1295}$$

#### Aufgabe 13

Construct the addition and multiplication tables for  $\mathbb{Z}_n$ , when  $n$  is 6 and when  $n$  is 7.

#### Aufgabe 14

find the following (multiplicative) inverses, if they exist:

$$\text{inverse of } [7]_{11}$$

$$\text{inverse of } [10]_{26}$$

$$\text{inverse of } [11]_{31}$$

$$\text{inverse of } [23]_{31}$$

$$\text{inverse of } [91]_{237}$$

#### Aufgabe 15

Construct the multiplication tables for  $\mathbb{Z}_n^*$ , when  $n$  is 16 and when  $n$  is 15.

#### Aufgabe 16 (die einzige mit Grübelpotenzial)

Show that no integer of the form  $8n + 7$  can be written as a sum of three squares.