

## Reading Questions 3

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1. The set  $\mathbb{N}$  contains the element 0.
2. Let  $3, 4 \in \mathbb{Z}_5$ . Then  $3 + 4 = 2$ .
3. List the elements of  $\mathbb{Z}_5$ .

### Section 1.3 Integers $\pmod n$ and Elementary Properties of Integers (Part 1)

#### Definitions

- P 1.** Let  $5, 6 \in \mathbb{Z}_4$ . Compute  $5 + 6$ ,  $5 \cdot 6$ , and  $5 - 6$ . Your answers should be elements of  $\mathbb{Z}_4$ .
- P 2.** If  $a = b \pmod n$  does  $b = a \pmod n$ ? If your answer is no, give a counter example.
- P 3.** Show that 22 is not prime.
- P 4.** Compute  $\phi(8)$  and  $\phi(9)$ .

#### Theorems

- P 5.** Let  $n, m \in \mathbb{Z}$ . Prove that there exists unique integers  $q$  and  $r$  such that  $n = mq + r$  where  $0 \leq r < m$ .
- P 6.** Write the prime factorization of 630.