Some theorems you need to know how to prove:

Theorem M1. If *p* is prime, then every non-zero element in $\mathbb{Z}_p$ is a unit

ok

Theorem M2. If *p* is prime, then $\mathbb{Z}_p$ has no zero-divisors. (B)

ok

Theorem M3. If *p* is prime, and *a* and *b* are constants and $a \neq 0$ in $\mathbb{Z}_p$, then $ax+b=0$ has a solution in $\mathbb{Z}_p$.

Theorem M4. If *p* is prime, and *a*, *b* and *c* are constants and $a \neq 0$ in $\mathbb{Z}_p$, then $ab=ac$ implies $b=c$.

useful

Theorem M5. If *n* is not prime, then there exists a zero-divisor in $\mathbb{Z}_n$.

Proved (F): if $1<a<n$ and $a|n$ then a is a zero-div. in $\mathbb{Z}_n$

Theorem M6. If ~~$a<n$ and $(a,n)>1$~~ $1<(a,n)<n$ then *a* is a zero-divisor in $\mathbb{Z}_n$.

ok

Theorem M7. If ~~$a<n$ and~~ $(a,n)=1$ then *a* is a unit in $\mathbb{Z}_n$.

ok

Examples you need to know:

1. Find numbers a,b,c,n such that $ab=ac$, and $a \neq 0$ but $b \neq c$ in $\mathbb{Z}_n$

2. Find numbers a,b,n, where $a \neq 0$, such that $ax+b=0$ has more than one solution in $\mathbb{Z}_n$.

2. Find numbers a,b,n, where $a \neq 0$, such that $ax+b=0$ has no solutions in $\mathbb{Z}_n$.

M8: In $\mathbb{Z}_n$ if $a \neq 0$, then a is a unit or a 0-divisor, but not both,

M9(?): If $n>2$ There are an even number of units in $\mathbb{Z}_n$

M10: 1 is a unit in $\mathbb{Z}_n$