

1. Find 6 different numbers equivalent to 8 modulo 25.
2. Fill in the blank with any number that makes the statement true:
  - (a)  $1776 \equiv \underline{\hspace{1cm}} \pmod{9}$
  - (b)  $-22 \equiv \underline{\hspace{1cm}} \pmod{7}$
  - (c)  $122 \equiv 197 \pmod{\underline{\hspace{1cm}}}$
3. Reduce 500 modulo 7.
4. Reduce  $-100$  modulo 30.
5. Compute  $120 \bmod 25$
6. Prove:  $\forall x \in \mathbb{Z}, (x + 1)^3 \equiv x^3 + 1 \pmod{3}$ .
7. Reduce all of these modulo 11:
  - (a)  $5^2$
  - (b)  $5^4$
  - (c)  $5^8$
  - (d)  $5^{16}$
  - (e)  $5^{32}$
  - (f)  $5^{64}$
  - (g)  $5^{70}$
8. Find the last two digits of  $2^{1024}$