

1. Compute $7^{160} \pmod{11}$. Your answer should be one of the numbers

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, *or* 10.

2. Show that if $a \equiv b \pmod{c}$ and $d \equiv f \pmod{c}$ then $ad \equiv bf \pmod{c}$

3. True or false? If a, b, c, d are positive integers and $a \equiv b \pmod{c}$ and $a \equiv b \pmod{d}$ then $a \equiv b \pmod{cd}$. (Prove or give a counterexample.)

4. List all the divisors that the numbers 75 and 45 have in common (and therefore deduce what is the gcd of 45 and 75).

5. Show that if a is any integer, then $a^3 - a$ is a multiple of 3.