

## MTH 4441 Homework #3 - Part 1 - Solutions

DUE: MONDAY, SEPTEMBER 20, 2021

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Name \_\_\_\_\_

### Compute the Following:

In each case, the answer should be the integer between 0 and  $n - 1$  to which the given expression is congruent modulo  $n$ .

1.  $32 \pmod{3} \equiv 2$

2.  $27 \pmod{5} \equiv 2$

3.  $81 \pmod{7} \equiv 4$

4.  $81 \pmod{6} \equiv 3$

5.  $81 \pmod{12} \equiv 9$

6.  $56 \pmod{9} \equiv 2$

7.  $59 \pmod{6} \equiv 5$

8.  $59 \pmod{7} \equiv 3$

9.  $59^5 \pmod{7} \equiv 3^5 \pmod{7} \equiv 243 \pmod{7} \equiv 5 \pmod{7} \equiv 5$

(Because  $59 \equiv 3 \pmod{7}$ )

10.  $59^5 \pmod{6} \equiv 5^5 \pmod{6} \equiv (-1)^5 \pmod{6} \equiv -1 \pmod{6} \equiv 5 \pmod{6} \equiv 5$

(Because  $59 \equiv 5 \pmod{6}$  and  $5 \equiv -1 \pmod{6}$ )

11.  $(45 \cdot 54) \pmod{4} \equiv (1 \cdot 2) \pmod{4} \equiv 2 \pmod{4} \equiv 2$

(Because  $45 \equiv 1 \pmod{4}$  and  $54 \equiv 2 \pmod{4}$ )

12.  $(253 \cdot 146) \pmod{5} \equiv (3 \cdot 1) \pmod{5} \equiv 3 \pmod{5} \equiv 3$

(Because  $253 \equiv 3 \pmod{5}$  and  $146 \equiv 1 \pmod{5}$ )