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HW 13: 3.1-3.3

M328K

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3.1 Exercise. *Show that 41 divides $2^{20} - 1$ by following these steps. Explain why each step is true.*

1. $2^5 \equiv -9 \pmod{41}$.

2. $(2^5)^4 \equiv (-9)^4 \pmod{41}$.

3. $2^{20} \equiv 81^2 \pmod{41} \equiv (-1)^2 \pmod{41}$.

4. $2^{20} - 1 \equiv 0 \pmod{41}$.

Solution. Type your solution here!

□

3.2 Question. *In your head, can you find the natural number k , $0 \leq k \leq 11$, such that $k \equiv 37^{453} \pmod{12}$?*

Solution. Type your solution here!

□

3.3 Question. *In your head or using paper and pencil, but no calculator, can you find the natural number k , $0 \leq k \leq 6$, such that $2^{50} \equiv k \pmod{7}$.*

Solution. Type your solution here!

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