

$$3^{513} \pmod{7}$$

$$6 \cdot 80 = 480$$

$$3^1 = 3$$

$$3^2 = 9 \equiv 2 \pmod{7}$$

$$3^3 \equiv 2 \cdot 3 \equiv 6$$

$$3^4 \equiv 6 \cdot 3 = 18 \equiv 4 \pmod{7}$$

$$3^5 \equiv 4 \cdot 3 = 12 \equiv 5 \pmod{7}$$

$$3^6 \equiv 5 \cdot 3 = 15 \equiv 1 \pmod{7}$$

$$3^{12} \equiv 3^6 \cdot 3^6 \equiv 1 \cdot 1 \equiv 1$$

$$3^{60} \equiv \underbrace{3^6 \cdot 3^6 \cdots 3^6}_{10 \text{ times}} \equiv (3^6)^{10} \equiv 1$$

$$3^{600} \equiv 1$$

$$3^{480} \equiv 1$$

$$3^{513} \equiv 3^{480} \cdot 3^{33}$$

$$\equiv 1 \cdot 3^{33} \equiv 3^{30} \cdot 3^3 \equiv 1 \cdot 3^3$$

$$\equiv 6$$

2.1# | a, b, c