

Q: Calculate $p = 43^{27} \bmod 55$

Solution $p = 43^{27} \bmod 55$

$$= 43^{26} \cdot 43 \bmod 55$$

$$= 12^{26} \cdot 43 \bmod 55$$

$$= (12^2)^{13} \cdot 43 \bmod 55$$

$$= 144^{13} \cdot 43 \bmod 55$$

$$= 34^{13} \cdot 43 \bmod 55$$

$$= 34^{12} \cdot 34 \cdot 43 \bmod 55$$

$$= (34^{3^4}) \cdot 1462 \bmod 55$$

$$= 39304^4 \cdot 1462 \bmod 55$$

$$= 34^4 \cdot 32 \bmod 55$$

$$= 42762752 \bmod 55$$

$$= 32$$

$$43 - 55 = -12$$

$$43 \bmod 55 \equiv -12 \bmod 55$$

$$43^{2k} \bmod 55 \equiv 12^{2k} \bmod 55$$

$$144 - 55 - 55 = 34$$

$$144 \bmod 55 \equiv 34 \bmod 55$$

$$39304 \div 55 = 714.6$$

$$714 \times 55 = 39270$$

$$39304 - 39270 = 34$$

$$1462 - 26 \times 55 = 32$$

$$42762752 - 777504 \times 55$$

$$=$$

Calculate Small Number
YOU CAN USE CASIO

