

Secret Writing & Modular Arithmetic

- ① TRUE
- ② FALSE
- ③ ANAGRAM
- ④ ACROSTIC
- ⑤ SUBSTITUTION
- ⑥ TRANSPOSITION
- ⑦ $n=21$

$$\begin{aligned} \textcircled{8} \quad 4x + 9 &\equiv 3 \pmod{11} \\ &\quad +2 \quad +2 \\ 4x + 11 &\equiv 5 \pmod{11} \\ 4x &\equiv 5 \pmod{11} \\ \cdot 3 \quad \cdot 3 \\ 12x &\equiv 15 \pmod{11} \\ \boxed{x &\equiv 4 \pmod{11}} \end{aligned}$$

$$\begin{aligned} \textcircled{9} \quad 3x + 4 &\equiv 8 \pmod{10} \\ &\quad +6 \quad +6 \\ 3x + 10 &\equiv 14 \pmod{10} \\ 3x &\equiv 4 \pmod{10} \\ \cdot 7 \quad \cdot 7 \\ 21x &\equiv 28 \pmod{10} \\ \boxed{x &\equiv 8 \pmod{10}} \end{aligned}$$

$$\begin{aligned} \textcircled{10} \quad 7x - 13 &\equiv 2x + 32 \pmod{9} \\ &\quad +13 \quad +13 \\ 7x &\equiv 2x + 45 \pmod{9} \\ +7x \quad +7x \\ 14x &\equiv 0 \pmod{9} \\ \cdot 5 \quad \cdot 5 \\ 5x &\equiv 0 \pmod{9} \\ \cdot 2 \quad \cdot 2 \\ 10x &\equiv 0 \pmod{9} \\ \boxed{x &\equiv 0 \pmod{9}} \end{aligned}$$

⑪ A T O
L O H
L G E
D L A
O L V
G I E
S W N

ATO LOH LGE DLA OLV GIE SWN

⑫ 9, 17, 25, 33, ... odd / 6 even / even (even or odd) = even ...

⑬ answers vary but must come from text ...

⑭ arrange letters of message as blocks into rectangle ...