

① A)

$$14 \cdot 52 = 728$$

728 = 14 of spades + 7 is = 7 clubs so after step

$$728 - 728 = 0$$

is complete it is the 4 of clubs

$$1 - 7 =$$

4 clubs

B)

$$137 = 39(3) + 20 = \text{mark } 39$$

②

A

$$-39 \% 7 = 3$$

$$11 \% 7 = 4$$

$$91 \% 7 = 0$$

$$-27 \% 7 = 1 \quad 37 \% 7 = 2$$

$$-8 \% 7 = 6 \quad 68 \% 7 = 5$$

91, -27, 37, -39, 11, 68, -8

B

$$311 \% 17 = 5$$

$$491 \% 17 = 7$$

$$-1 - 21702 \% 17 = 12 = n$$

$$\overline{17} = 20.7$$

$$1190$$

C

$$405 \% 17 = 4$$

$$777 \% 17 = 12$$

$$34965 = 17(2056) + 13 = n$$

10

$$710^1 \% 17 = 13$$

$$710^2 \% 17 = 13^2 = 169 \% 17 = 16$$

$$710^3 \% 17 = 13(16) = 4$$

$$710^4 \% 17 = 13(4) = 1$$

$$710^4 \equiv 1 \pmod{17}$$

$$710^{447} \equiv (710^3)(710^4)^{111} \equiv 4(1) = \boxed{4}$$

3

$$334 = 163 \pmod{253}$$

$$\frac{334}{3} + \frac{253}{3} = \frac{163}{3} \quad \gcd = 3$$

$$11x + 251y = 61 \quad \gcd \text{ of } 251, 11$$

$$251 = 22 \cdot 11 + 9$$

$$11 = 1 \cdot 9 + 2$$

$$9 = 4 \cdot 2 + 1$$

$$2 = 2 \cdot 1 + 0$$

$$9 = 251 - 22 \cdot 11$$

$$2 = 11 - 1 \cdot 9$$

$$1 = 9 - 4 \cdot 2$$

$$1 = 9 - 4(11 - 1 \cdot 9)$$

$$1 = 5 \cdot 9 - 4 \cdot 11$$

$$1 = 5 \cdot (251 - 22 \cdot 11) - 4 \cdot 11$$

$$1 = 5 \cdot (251) - 114 \cdot (11)$$

$$125 \cdot (251) - 114 \cdot (11) \leftarrow \text{times } 183$$

$$143 = 183 \left(\begin{array}{c} \swarrow \\ x \end{array} \right)$$

$$\text{with } 915(251) - 10862(11) = 183$$

$$305(753) - 6954(33) = 183$$

$$x = -6954 + k \left(\frac{251}{1} \right)$$

$$\downarrow$$

$$28$$

$$x = 74 + 251k$$

4

A) 10 questions \rightarrow 4 possible for each

$$4^{10}$$

B) can be left on answer means that 5 options

$$5^{10}$$

5

$$A) 26^7 - 25^7$$

$$B) 26^7 - 25^7 - 7 \cdot 25^6$$

6

$$25^3 \cdot 10^2 + 25^2 \cdot 10^3$$