1. In the table, we take *left side number* and subtract *top side number*. For the first entry, we have $0 - 0 = 0$. For the next entry to the right of 0, we have $0 - 1 = -1$, which is $-1 + 7 = 6 \pmod 7$. Continue to create the table below.

Modulo 7 Subtraction

$\ominus$	0	1	2	3	4	5	6
0	0	6	5	4	3	2	1
1	1	0	6	5	4	3	2
2	2	1	0	6	5	4	3
3	3	2	1	0	6	5	4
4	4	3	2	1	0	6	5
5	5	4	3	2	1	0	6
6	6	5	4	3	2	1	0

2. (a) $\boxed{\text{True}}$ (b) $\boxed{\text{False}}$

3. $\boxed{2}$

4. $2001 \times 2003 \times 2005 \times 2007 \times 2009 \times 2011 \pmod 9$
   $= 3 \times 5 \times 7 \times 0 \times 2 \times 4 = \boxed{0}$

5. (a) $\boxed{2}$ (b) $\boxed{0}$ (c) $\boxed{0}$

6. $\boxed{0}$

7. Numbers that are congruent to $5 \pmod 7$ are of the form $7k + 5$. We want all the numbers k such that $1000 \leq 7k + 5 \leq 2000$. Let's solve this inequality by first subtracting all sides by 5: $995 \leq 7k \leq 1995$. Now we divide all sides by 7: $142.143 \leq k \leq 285$. So k can be any of the numbers in the list $143, 144, 145, \ldots, 284, 285$. How do we count the numbers in this list? Subtract the smallest from the largest and add one: $285 - 143 + 1 = \boxed{143}$

8. (a) It is probably easiest to just compute the sum, which is 3, and find what 3 is mod 6, which is just $\boxed{3}$.

   Or we can find the mod 6 of each number. $12 \pmod 6 \equiv 0$, $11 \pmod 6 \equiv 5$, $10 \pmod 6 \equiv 4$, $9 \pmod 6 \equiv 3$, $8 \pmod 6 \equiv 2$, and $7 \pmod 6 \equiv 1$. Now we have $12 - 11 + 10 - 9 + 8 - 7 \equiv 0 - 5 + 4 - 3 + 2 - 1 \pmod 6 \equiv -5 + 1 + 1 \equiv -3 \pmod 6 \equiv \boxed{3}$

   (b) Let's find what $101 \pmod 6$ is. We can find that $101 \equiv 5 \pmod 6 \equiv -1 \pmod 6$. Now we take the equivalence $101 \equiv -1 \pmod 6$ and raise both numbers to the 99th power: $(101)^{99} \equiv (-1)^{99} \pmod 6$. What is -1^{99}? It is $-1 \times -1 \times -1 \times \cdots \times -1$ 99 times, which is -1. So $(101)^{99} \equiv (-1)^{99} \pmod 6 \equiv -1 \pmod 6$. Since $-1 \equiv 5 \pmod 6$, then the residue of 101^{99} mod 6 is $\boxed{5}$

9. Altogether they have $83 + 129 = 212$ quarters and $159 + 266 = 425$ dimes. Now we need to find what coins will be left over after they put them in rolls, and we will use mods. $212 \equiv 12 \pmod{40}$ (we use mod 40 because the quarter rolls contain 40 quarters), and $425 \equiv 25 \pmod{50}$. So there are 12 quarters left and 25 dimes. The quarters are worth $12 \times 0.25 = \$3.00$, and the dimes are worth $25 \times 0.10 = \$2.50$, so the total worth of the leftover coins is $\boxed{\$5.50}$.

10. If each bag contains a quarter, a dime, a nickel, and a penny, then each bag contains $0.25 + 0.10 + 0.05 + 0.01 = \$0.41$. She has 73 of these, so she has a total of $73 \times \$0.41 = \$29.93$. If she exchanges this amount for dollars, dimes, and pennies, then she will get 29 dollars, 9 dimes, and $\boxed{\text{3 pennies}}$.