Homework 16 Solutions

1. **Write down the addition and multiplication tables for arithmetic mod 7. That is, create tables of 7 rows and 7 columns, showing the sum and product of each pair of numbers.**

   The addition table looks like

+	0	1	2	3	4	5	6
0	0	1	2	3	4	5	6
1	1	2	3	4	5	6	0
2	2	3	4	5	6	0	1
3	3	4	5	6	0	1	2
4	5	6	0	1	2	3	4
5	5	6	0	1	2	3	4
6	6	0	1	2	3	4	5

   The multiplication table looks like

×	0	1	2	3	4	5	6
0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6
2	0	2	4	6	1	3	5
3	0	3	6	2	5	1	4
4	0	4	1	5	2	6	3
5	0	5	3	1	6	4	2
6	0	6	5	4	3	2	1

2. **In arithmetic mod 7, what is 2-5? Remember, this is the number that, when added to 5, gives a result of 2.**

   Looking at the addition table, we see that the answer is $\boxed{4}$.

3. **In arithmetic mod 7, what is 2/5? Remember, this is the number that, when multiplied by 5, gives a result of 2.**

   Looking at the multiplication table, we see that the answer is $\boxed{6}$.

4. **Is there a square root of 2 in arithmetic mod 7? That is, is there a number that, when multiplied by itself, gives a result of 2?**

   Looking at the multiplication table, we see that there are, in fact, two square roots of 2, namely $\boxed{3 \text{ and } 4}$.