Part (a): $\boxed{h(k) = k \% 7}$

0	
1	15
2	2̶2̶ R
3	
4	
5	36
6	

- Insert 1̶5̶ ($15 \% 7 = 1$) ✓
- Insert 22 ($22 \% 7 = 1$) ✓
  $1 + 1^2 = 2$ ✓
- Insert 36 ($36 \% 7 = 1$)
  $1 + 1^2 = 2$ ✗
  $1 + 2^2 = 5$ ✓
- Remove 22:
  Modify 22 by "R" symobl

- Find 36:
sequence:

index	1	2	5
element	15	R	36

- Insert 10:
  ∵ Inserting 10 into the original hashtable would make the load factor $> 1/2$
  ∴ Resize the hashtable to 1̶2̶ 11 and rehash all the existing keys
  ∴ The final hashtable would look like one in the right

0	
1	
2	
3	36
4	15
5	
6	
7	
8	
9̶ 9	
1̶0̶ 10	10

$$15 \% 11 = 4$$
$$36 \% 11 = 3$$
$$10 \% 11 = 10$$

Part (b):

$\boxed{\begin{array}{l} \cdot h_1(k) = k \% 7 \\ \cdot h_2(k) = 3 - (k \% 3) \end{array}}$

0	
1	1̶5̶
2	
3	2̶2̶ R
4	36
5	
6	

- Insert 15 ($15 \% 7 = 1$) ✓
- Insert 22 ($22 \% 7 = 1$)
  $3 - (22 \% 3) = 2$
  ($∴ 1 + 2 = 3$) ✓
- Insert 36 ($36 \% 7 = 1$)
  $3 - (36 \% 3) =$
  ($∴ 1 + 3 = 4$)

- Remove 22:
  Modify 22 by "R" symbol
- Find 36: sequence

sequence:

index	1	4
element	15	36

- Insert 10: ⟶

  ($10 \% 7 = 3$)

0	
1	15
2	
3	10
4	36
5	
6	

Part (c):

If there are 27 items to search and $2^n/3$ items are set to true. Therefore, the number of false positives would be $27 \times \left(\frac{2}{3}\right)^3 = 8$ by linearity of expectation.