

MA383 Foundations in Mathematics
Lesson 26: More Functions

1. Let $f : \mathbb{Z}_8 \rightarrow \mathbb{Z}_8$ be given by $f(x) = x^2 + 3x \pmod{8}$. Complete the following table:

x	$f(x)$
0	0
1	4
2	
3	2
4	
5	
6	6
7	

- (a) What is the image of 2?
- (b) What is the set of preimages of 2?
- (c) What is the image of 5?
- (d) What is the set of preimages of 5?
- (e) Are the following statements true or false? Justify your conclusions.
 - For all $x, y \in \mathbb{Z}_8$, if $x \neq y$, then $f(x) \neq f(y)$.

- For each $y \in \mathbb{Z}_8$, there is an $x \in \mathbb{Z}_8$ such that $f(x) = y$.

2. Now work through problems 1, 3, 5, and 6 in section 6.2 of your textbook.