

Name: \_\_\_\_\_

# Lecture 11, class activity. Set operations.

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1. Let  $A = B = \{a, b, c, d\}$  and define the function  $f: A \rightarrow B$  with
- |        |     |     |     |     |
|--------|-----|-----|-----|-----|
| $x$    | $a$ | $b$ | $c$ | $d$ |
| $f(x)$ | $b$ | $c$ | $b$ | $c$ |

Show that  $f$  is neither injective nor surjective.

2. Let  $A = B = \{a, b, c, d\}$  and define the function  $g: A \rightarrow B$  with
- |        |     |     |     |     |
|--------|-----|-----|-----|-----|
| $x$    | $a$ | $b$ | $c$ | $d$ |
| $g(x)$ | $b$ | $c$ | $d$ | $a$ |

Show that  $f$  is both injective and surjective.

Can you describe in words “what  $g$  does”?

3. Consider the function  $h: [-3, 3] \rightarrow \mathbb{R}$  given by  $h(x) = x^3$ .

Show that  $h$  is injective, but not surjective.

Is there a way to change the codomain of  $h$  to make it bijective?