

5.1 Functions

* Relation: is a collection of ordered pairs (a, b)

- Domain: the 1st elements of the ordered pairs
- Range: the 2nd elements of the ordered pairs.

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Mapping

$$R = \{ (3, 2), (-2, 3), (-4, -3), (1, -3) \}$$

Domain R Range

- ① $R: 3 \rightarrow 2$
The Relation (R) maps 3 to 2.
- ② $R: -2 \rightarrow 3$
- ③ $R: -4 \rightarrow -3$
- ④ $R: 1 \rightarrow -3$

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* Function: is a Relation if and only if (iff) an element of the Domain is paired with exactly one element of the Range.

* Meaning: if we have a repeated element from the Domain then it must be paired with the same element in the range.

example

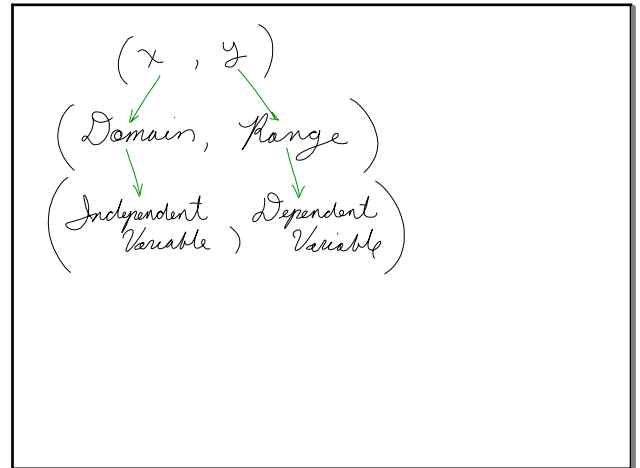
$(5, -4), (2, -8), (5, -6)$ a function!

$5 \rightarrow -4 \quad 5 \rightarrow -6$

$(5, -4), (2, -8), (5, 9)$ not a function

$5 \rightarrow -4 \quad 5 \rightarrow 9$

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Domain f Range

"Rule" \rightarrow "Software"
2 times the Independent Variable

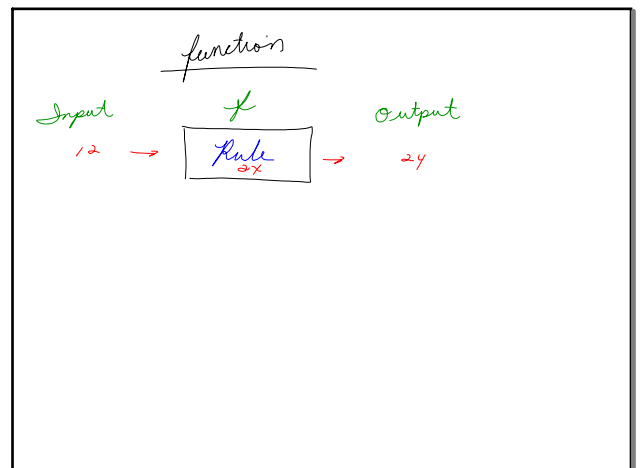
$f: 1 \rightarrow 2$

$f: 2 \rightarrow 4$

$f: x \rightarrow 2x$

What would 12 be mapped to?
 $f: 12 \rightarrow 2(12)$
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