

$$\{ y \in \text{chipmunks} \mid y \text{ is in Gettysburg} \}$$

$$A \subseteq B \quad A \text{ is a subset of } B$$

for all x if $x \in A$ then $x \in B$

$$A = \{1, 2\} \quad B = \{1, 2, 3, 4, 5\}$$

$$A \subseteq B$$

$$C = \{1, 2, 7\} \quad C \not\subseteq B$$

$$A \subset B: \quad A \subseteq B \text{ and there is } y \in B \text{ that } y \notin A$$

$$A \subsetneq B$$

$$D = \{1, 2, 3\} \quad E = \{3, 2, 1\}$$

$$D = E \quad D \subseteq E \quad E \subseteq D$$

$$D \not\subseteq F \quad E \not\subseteq D$$

Cartesian Product of A and B

$$A \times B$$

$$A = \{1, 2, 3\} \quad A \times B = \{(1, 4), (1, 5), \\ (2, 4), (2, 5), \\ (3, 4), (3, 5)\}$$

$$B = \{4, 5\}$$

$$A \times B = \{(a, b) \mid a \in A, b \in B\}$$

Relation

$$A = \{0, 1, 2\}$$

$$B = \{0, 3, 4\}$$

$R: x \in A$ is related to $y \in B$
if and only if $2x = y$

$$\checkmark 0 R 0$$

$$0 \not R 3$$

$$0 \not R 4$$

$$1 R 0$$

$$1 \not R 3$$

$$1 \not R 4$$

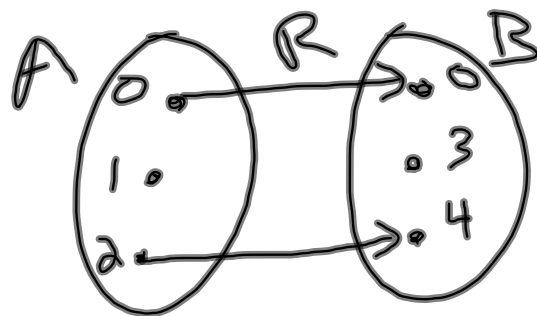
$$2 \not R 0$$

$$2 \not R 3$$

$$2 R 4 \checkmark$$

$$R = \{(0, 0), (2, 4)\}$$

$$R \subseteq A \times B$$



$$x \leq y$$

$$\frac{\text{in } \leq}{\begin{array}{l} (3,5) \\ (2,2) \end{array}}$$

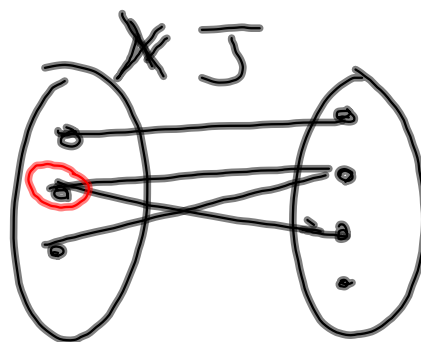
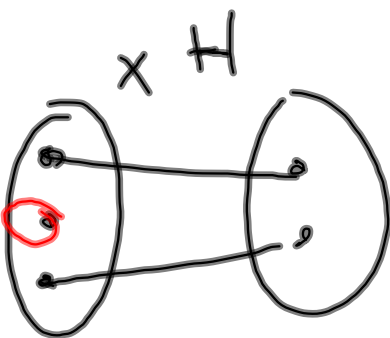
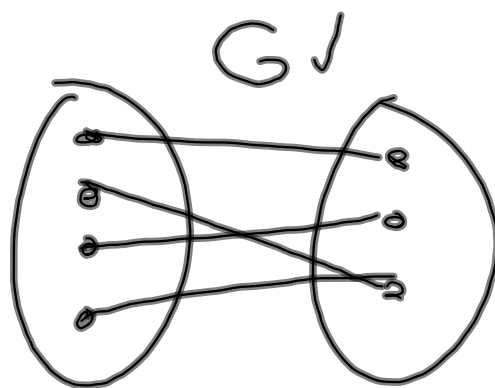
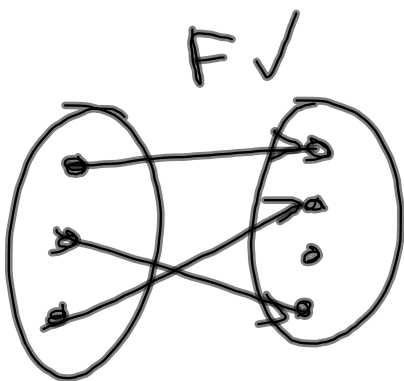
$$x, y \in \mathbb{Z}$$

$$\frac{\text{not in } \leq}{(5,3)}$$

Functions

a function f is a relation
from a set A to a set B
with the conditions:

1. For every $x \in A$, there is
a $y \in B$ such that $(x, y) \in f$
2. For all $x \in A$ and $y, z \in B$
if $(x, y) \in f$ and $(x, z) \in f$
then $y = z$



Statements: a sentence that is either True or false, but not both.

operators

and

$\wedge$

$p \wedge q$

or

$\vee$

$p \vee q$

not

$\sim$

$\sim p, \neg p, !p$

p	q	$p \wedge q$	$p \vee q$	$\sim p$
T	T	T	T	F
T	F	F	T	F
F	T	F	T	T
F	F	F	F	T