

### Excercises 1

#### Excercise 1: Identifying sets

Which of the following are valid sets, and which are not?

- (1) a.  $\{\text{♁, ♀, ♀, ♀, ♀, ♀}\}$
- b.  $\{\text{Obama, 'Obama', \{Obama\}}\}$
- c.  $\{x \mid x \text{ is a multiple of } 17\}$
- d.  $\{x, \text{sofa, prime, Pizza, } 0, \Phi, \text{♁}, x\}$
- e.  $\{\{\{\{\{\Phi\}\}\}\}\}$
- f.  $\{\}$  (also written as  $\emptyset$ )

#### Excercise 2: Identifying set members and sets

- What are the members of the following sets?

- (2) a.  $\{x \mid x \text{ is a multiple of } 12 \text{ below } 60\}$
- b.  $\{x \mid x \text{ is the set containing all multiples of } 12 \text{ below } 60\}$
- c.  $\{\text{vowel, yellow, 'gelb', \{vowel, yellow, 'gelb'\}, \Phi}\}$
- d.  $\{\{\{\{\{\Phi\}\}\}\}\}$
- e.  $\{\text{Bart}\}$
- f.  $\{\text{Bart, 'Bart', \{Bart\}}\}$

- For the set  $OS = \{\text{Olaf Scholz}\}$ , which of the following is True or False?

- (3) a. Olaf Scholz is a member of OS.
- b.  $\{\text{Olaf Scholz}\}$  is a member of OS.
- c. The current Bundeskanzler of Germany is a member of OS.

- What is the set whose only member is  $\{S\}$ ?

#### Excercise 3: List to predicate notation

- Convert each of the sets in list notation below to predicate notation.

- (4) a.  $\{2, 4, 6, 8, 10\}$
- b.  $\{\text{Bart, Lisa, Homer, Marge, Maggie}\}$
- c.  $\{\text{Leipzig}\}$
- d.  $\{\text{'Bart', 'Lisa', 'Homer', 'Marge', 'Maggie'}\}$
- e.  $\{\}$

#### Excercise 4: Predicate to list notation

- Convert each of the sets in predicate notation below to list notation.

- (5) a.  $\{x \mid x \text{ is an odd number smaller than } 12\}$
- b.  $\{z \mid z \text{ is the name of the first president of the USA}\}$
- c.  $\{a \mid a \text{ is a triangular circle}\}$

#### Excercise 5: Subset superset relations

- List the proper subset and proper superset relations that hold between the following sets. (To answer this question, you might first need to find out what the facts are.)

- (6)
- a.  $A = \{ x \mid x \text{ is a Beatles song written by Paul McCartney} \}$
  - b.  $C = \{ x \mid x \text{ is a Beatles song written by Ringo Starr} \}$
  - c.  $D = \{ \text{Let it be, Maxwell's Silver Hammer, Hey Jude} \}$
  - d.  $F = \{ \}$