

Excercises 1

Excercise 1: Identifying sets

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

- (1) a. $\{\text{♁}, \text{♁}, \text{♁}, \text{♁}, \text{♁}, \text{♁}\}$
- b. $\{\text{Obama}, \text{'Obama'}, \{\text{Obama}\}\}$
- c. $\{x \mid x \text{ is a multiple of } 17\}$
- d. $\{x, \text{sofa}, \text{prime}, \text{Pizza}, 0, \Phi, \text{♁}, x\}$
- 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. $\{\text{vowel}, \text{yellow}, \text{'gelb'}, \{\text{vowel}, \text{yellow}, \text{'gelb'}\}, \Phi\}$
- d. $\{\{\{\{\{\Phi\}\}\}\}\}$
- e. $\{\text{Bart}\}$
- f. $\{\text{Bart}, \text{'Bart'}, \{\text{Bart}\}\}$

- 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. $\{\text{Bart}, \text{Lisa}, \text{Homer}, \text{Marge}, \text{Maggie}\}$
- c. $\{\text{Leipzig}\}$
- d. $\{\text{'Bart'}, \text{'Lisa'}, \text{'Homer'}, \text{'Marge'}, \text{'Maggie'}\}$
- 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. $F = \{ \}$