

MATH 3310 HOMEWORK ASSIGNMENT 3

DUE ON FRIDAY 8 FEBRUARY 2019

(1) Describe the set $\{*, \{\ast\ast}\} \times \mathcal{P}(\{*, \{\ast\ast}\})$ by listing its elements in braces.

(2) Consider the sets

$$X = \{x \in \mathbb{R} \mid |x - 1| \leq 2\} \quad \text{and} \quad Y = \{y \in \mathbb{R} \mid |y + 1| \leq 2\}.$$

Draw the subset $X \times Y$ of $\mathbb{R} \times \mathbb{R}$.

(3) Consider the open sentence

$$p(X): X \subset \{a, b, c\}, \quad X \in \mathcal{P}(\{b, c, d\}).$$

- (a) For which elements X in the domain $\mathcal{P}(\{b, c, d\})$ is the statement $p(X)$ true?
- (b) For which elements X in the domain $\mathcal{P}(\{b, c, d\})$ is the statement $p(X)$ false?

(4) State the negation of each of the following statements:

- (a) 0 is not a negative number.
- (b) At least two students came late to my first class today.
- (c) No one thought they would cancel exams due to snow.
- (d) The point P in the plane lies within the circle C .
- (e) A right triangle is equilateral.
- (f) One of my parents was born in the 1970s.

(5) Let p and q be statements; construct the truth table for the statement

$$(p \implies q) \implies \sim q.$$