Math 330 Section 1 - Fall 2016 - Homework 03

Published: Friday, September 9, 2016   *Running total:* 15 *points*
Last submission: Wednesday, September 14, 2016   **NO RESUBMISSIONS**
*(that is two days **before** the last submission date for hwk 2!)*

Written assignments 1-4

Do the four exercises of MF ch. 2.3.2: Examples and exercises for sets. Each one is worth two points!

In the MF doc refer to example 4.4 for the preliminary definition of cardinality of a set and to def.4.1 (Cartesian Product of two sets) for the definition of Cartesian product. You find both in ch.4.1 (Cartesian products and relations) on approx. p.68. Reminder: this chapter was part of the assigned reading for Friday, September 9, 2016.

Written assignment 1 (exercise 2.1):

Let $X = \{x, y, \{x\}, \{x, y\}\}$. True or false?

  a. $\{x\} \in X$ **c.** $\{\{x\}\} \in X$ **e.** $y \in X$ **g.** $\{y\} \in X$
  b. $\{x\} \subseteq X$ **d.** $\{\{x\}\} \subseteq X$ **f.** $y \subseteq X$ **h.** $\{y\} \subseteq X$

Written assignment 2 (exercise 2.2):

Find the cardinality of each of the following sets:

  a. $A = \{x, y, \{x\}, \{x, y\}\}$ **c.** $C = \{u, v, v, v, u\}$ **e.** $E = \{\sin(k\pi/2) : k \in \mathbb{Z}\}$
  b. $B = \{1, \{0\}, \{1\}\}$ **d.** $D = \{3z - 10 : z \in \mathbb{Z}\}$ **f.** $F = \{\pi x : x \in \mathbb{R}\}$

Written assignment 3 (exercise 2.3):

Let $X = \{x, y, \{x\}, \{x, y\}\}$ and $Y = \{x, \{y\}\}$. True or false?

  a. $x \in X \cap Y$ **c.** $x \in X \cup Y$ **e.** $x \in X \setminus Y$ **g.** $x \in X \Delta Y$
  b. $\{y\} \in X \cap Y$ **d.** $\{y\} \in X \cup Y$ **f.** $\{y\} \in X \setminus Y$ **h.** $\{y\} \in X \Delta Y$

Written assignment 4: Written assignment 4 (exercise 2.4):

Let $X = \{1, 2, 3, 4\}$ and let $Y = \{x, y\}$.

  a. What is $X \times Y$?   **c.** What is $\operatorname{card}(X \times Y)$?   **e.** Is $(x, 3) \in X \times Y$?   **g.** Is $3 \cdot x \in X \times Y$?
  b. What is $Y \times X$?   **d.** What is $\operatorname{card}(Y \times X)$?   **f.** Is $(x, 3) \in Y \times X$?   **h.** Is $2 \cdot y \in Y \times X$?