

HOMEWORK 2

TEMPLATE MATH 2001

SEBASTIAN CASALAINA

ABSTRACT. This is the second homework assignment. The problems are from Hammack [Ham13, Ch. 1, §1.2]:

- **Chapter 1 Exercises: Section 1.2:** 2, 4, 8, 12, 18.
- From the .pdf, Exercises: 1.48, 1.49.

SECTION 1.2

Problem 2. Suppose $A = \{\pi, e, 0\}$ and $B = \{0, 1\}$. Write out the indicated sets by listing their elements between braces.

- (a) $A \times B$.
- (b) $B \times A$.
- (c) $A \times A$.
- (d) $B \times B$.
- (e) $A \times \emptyset$.
- (f) $(A \times B) \times B$.
- (g) $A \times (B \times B)$.
- (h) $A \times B \times B$

Solution to Problem 2.

Date: February 13, 2016.

I would like to take this opportunity to thank my class for their support.

$$1 \rightarrow \quad (a) \quad A \times B = \{(\pi, 0), (\pi, 1), (e, 0), (e, 1), (0, 0), (0, 1)\}. \quad 1$$

$$2 \rightarrow \quad (b) \quad B \times A = \{(0, \pi), (1, \pi), (0, e), (1, e), (0, 0), (1, 0)\}. \quad 2$$

$$(c) \quad A \times A = \dots$$

$$(d) \quad B \times B.$$

$$(e) \quad A \times \emptyset.$$

$$(f) \quad (A \times B) \times B.$$

$$(g) \quad A \times (B \times B).$$

$$(h) \quad A \times B \times B$$

EXERCISES FROM THE .PDF

Exercise 1.48. Let $A = \{1, 2, 4, 6\}$, $B = \{3, 2, 5\}$ and $C = \{2, 5, 10\}$.

Find the following sets:

$$(1) \quad A \cup B.$$

$$(2) \quad A \cap B.$$

$$(3) \quad A - B.$$

$$(4) \quad B - A.$$

$$(5) \quad (B \cup C) - A.$$

$$(6) \quad (A \cup C) \cap B.$$

$$(7) \quad \mathcal{P}(B).$$

Solution to Exercise 1.48.

$$3 \rightarrow \quad (1) \quad A \cup B = \{1, 2, 4, 6, 3, 5\}. \quad 3$$

¹I worked on this problem with the entire class. You are encouraged to work together on homework assignments. However, for each problem you must write your own solution, you must indicate with whom you worked, and you must cite any resources you used in solving the problem.

²I worked on this problem with the entire class.

³I worked on this problem with the entire class.

$$(2) A \cap B = \{2\}.^4$$

 $\leftarrow 4$

$$(3) A - B = \{1, 4, 6\}.^5$$

 $\leftarrow 5$

$$(4) B - A.$$

$$(5) (B \cup C) - A.$$

$$(6) (A \cup C) \cap B.$$

$$(7) \mathcal{P}(B).$$

⁴I worked on this problem with the entire class.

⁵I worked on this problem with the entire class.

SOME EXAMPLES THAT MIGHT BE USEFUL

Theorem A. *The theorem*

1. THE FIRST SECTION

[AM69]

$$(1.1) \quad \begin{array}{ccc} X & \xrightarrow{f} & Y \\ \pi \downarrow & \nearrow & \\ Z & & \end{array}$$

$$\begin{array}{ccc} \mathcal{A} & \xrightarrow{f} & B \\ \parallel & & \\ C & \longrightarrow & D \end{array}$$

This is the full version

REFERENCES

- [AM69] M. F. Atiyah and I. G. Macdonald, *Introduction to commutative algebra*, Addison-Wesley Publishing Co., Reading, Mass.-London-Don Mills, Ont., 1969. MR 0242802 (39 #4129)
- [Ham13] Richard Hammack, *Book of proof*, Creative Commons, 2013.

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