HOMEWORK 1

TEMPLATE
MATH 2135

SEBASTIAN CASALAINA

Abstract. This is the first homework assignment. The problems are from Hammack [Ham13, Ch. 12, §12.1–5]:

- **Chapter 12 Section 1**, Exercises: 4,6.
- **Chapter 12**, **Section 2** Exercises: 5,10,16.
- **Chapter 12**, **Section 4** Exercises: 2,6,10.
- **Chapter 12**, **Section 5** Exercises: 2,8.

In the future, we will do exercises out of [Apo69].

Section 1.1

The following exercises are not assigned, but are just here to give an example.

Problem 2. Write the following set by listing its elements between braces: $\{3x + 2 : x \in \mathbb{Z}\}$. [1] ←1

Solution to Problem 2.

$$\{3x + 2 : x \in \mathbb{Z}\} = \{\ldots, -7, -4, -1, 2, 5, 8 \ldots\}.$$

Date: January 17, 2018.

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

[1] I 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.

Problem 8. Write the following set by listing its elements between braces: $\{x \in \mathbb{R} : x^3 + 5x^2 = -6x\}$.

Solution to Problem 8. For $x \in \mathbb{R}$,

$$\begin{aligned} x^3 + 5x^2 = -6x &\iff x^3 + 5x^2 + 6x = 0 \\ &\iff x(x^2 + 5x + 6) = 0 \\ &\iff x(x+2)(x+3) = 0 \\ &\iff x = 0, \text{ or } x = -2, \text{ or } x = -3. \end{aligned}$$

Therefore,

$$\{x \in \mathbb{R} : x^3 + 5x^2 = -6x\} = \{0, -2, -3\}.$$

Some LaTeX examples that might be useful

Theorem A. *The theorem*

1. The first section

[AM69]

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

$$\begin{array}{ccc} \not{A} & \xrightarrow{f} & B \\ \| & & \\ C & \longrightarrow & D \end{array}$$

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)

[Apo69] Tom M. Apostol, *Calculus. Vol. II: Multi-variable calculus and linear algebra, with applications to differential equations and probability*, Second edition, Blaisdell Publishing Co. Ginn and Co., Waltham, Mass.-Toronto, Ont.-London, 1969. MR 0248290

[Ham13] Richard Hammack, *Book of proof*, Creative Commons, 2013.

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