

Worksheet for Week 1

Before the first class watch the videos 1,2, and 3 in <https://personal.math.ubc.ca/~PLP/auxiliary.html>

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Examples to cover in class

1. List the elements of the following sets.

- $\{n^2 \mid n \in \mathbb{Z}\}$
- $\{x \in \mathbb{Z} \mid x^2 - 2 = 0\}$
- $\{x \in \mathbb{R} \mid x^2 - 2 = 0\}$
- $\{x^2 \mid x \in (-3, 1]\}$
- $B = \{x \in A \mid x < \frac{1}{2\pi}\}$ given that $A = \{\frac{1}{n} \mid n \in \mathbb{N}\}$.

2. Let $A = \{\dots, -8, -4, 0, 4, 8, \dots\}$ and $B = \{\dots, -6, -3, 0, 3, 6, \dots\}$. Write the sets A and B in set builder notation.

Now, let C be the set of all elements which are sums of an element from A and an element from B . Write C in a set builder notation in two different ways.

What can we say about the elements of this set? Is $1 \in C$, $2 \in C$, $3 \in C$, $5 \in C$? Discuss.

3. Consider the following problem:

Assume that we got rid of all currency and introduced new coins worth 3 'stones' and 7 'stones' (*stone* is our new currency now). Also assume that everyone has enough coins. Write in set-builder notation the set of prices an object can be charged.

(E.g: If we only had coins worth 4 and 19 stones, we could still charge 1 stone, since someone could give us 5 coins of 4 and we could return 1 coin of 19).

Before the next lecture, watch videos 4,5, and 7 in <https://personal.math.ubc.ca/~PLP/auxiliary.html>

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$$\textcircled{2} \quad A = \{n \mid n = 4k, k \in \mathbb{Z}\}$$

$$B = \{y \mid y = 3k, k \in \mathbb{Z}\}$$