MATHEMATICAL METHODS

TUTORIAL 2

Problem 1. Let $x \in \mathbb{F}$, where $\mathbb{F}$ is a field. Prove that then there exists a *unique* additive inverse $-x$ of x.

Problem 2. Let $a \in \mathbb{F}$, $b \in \mathbb{F}$ and $y \in \mathbb{F}$, where $\mathbb{F}$ is a field. Prove that if $a + x = a + y$, then $x = y$.

Problem 3. Let $x \in \mathbb{F}$, where $\mathbb{F}$ is a field. Prove that $0 \cdot x = 0$ and also that $(-1) \cdot x = -x$.

Problem 4. We are investigating the growth of a tree trunk. At the first measurement, the diameter of the trunk was 10 cm, and after three years it was 15 cm. We want to know what the value of the diameter will be 8 years after the first measurement, if:

(1) we assume that the tree trunk growth obeys the natural law;
(2) we assume that the tree trunk growth obeys the logistic law, where the largest possible diameter of a tree trunk cannot be greater than 20 cm.

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