UA 2 Practical 1

(0) in the def. of abelianess show that "term operation" cannot be replaced by "basic op."

(1)
- group is abelian $\iff$ it is commutative
- ring is abelian $\iff$ $\forall x,y \; xy = 0$
- semilattice is abelian $\iff$ trivial
- algebra with a majority operation is abelian $\iff$ trivial

(2) $\underline{A}$ ... abelian with Mal'cev polynomial operation
Define $+, -, 0, R, r.$ as in the lecture (1)
Prove:
- $+$ is associative
- $x + (-x) = 0$
- $r(x+y) = rx + ry$

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(3) Take $(A;+) \cong (\mathbb{Z}_4;+)$; $(A,*) \cong (\mathbb{Z}_2 \times \mathbb{Z}_2;+)$
Then $(A;+,*)$ is not abelian

(4) $\mathcal{V}$ .. variety with a Mal'cev term.
Then $\mathcal{V}_{ab} = \{\underline{A};\ \underline{A} \text{ is abelian}, \underline{A} \in \mathcal{V}\}$ is a variety

(5) Prove implication "$\underline{A}$ has central Mal'cev op. $\Rightarrow$ $\underline{A}$ affine" directly

(6) Show that
- $C(\alpha,\beta;\delta_1), C(\alpha,\beta;\delta_2) \Rightarrow C(\alpha,\beta;\delta_1 \wedge \delta_2)$
- $C(\alpha,\beta;\alpha), C(\alpha,\beta;\beta)$