

Cover Page



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Propositions

appended to the thesis

Arithmetic of affine del Pezzo surfaces

by

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1. The algebraic Brauer group modulo constants of an ample log K3 surface of geometrically irreducible type of degree at most 7 is one of 27 possible finite groups. *joint with dr. Bright*
2. Let $U = X \setminus C$ be an ample log K3 surface of geometrically irreducible type of degree at most 7 over a number field k . The order of $\text{Br } U / \text{Br } k$ is bounded by a constant which only depends on the degree of k . *joint with dr. Bright*
3. There exist ample log K3 surfaces over \mathbb{Q} which admit a model with an order 5 Brauer–Manin obstruction to the integral Hasse principle.
4. Let k be an algebraically closed field and Z a curvilinear scheme of degree r on a smooth surface S over k .
The blowup $B \rightarrow S$ of S in Z decomposes as $B \xleftarrow{\gamma} X \xrightarrow{\pi} S$ where π is the composition of r blowups in closed k -points, and γ is the morphism which contracts all integral curves on X of self-intersection -2 which are contracted by π .
5. Let k be a positive integer. We consider all possible football matches in which $2k$ goals are scored in total. The number of such matches in which the end result is a draw equals the number of such matches in which the home team is never behind. (By a “football match” we mean the set of all intermediate pairs of scores that occur during the match.)
(MOAWOA 2016)
joint with dr. Van Bommel
6. The sequence
$$1, 14, 144, 1444, 14444, \dots$$
contains precisely three squares. (LIMO 2017)
7. Fix a prime p . Let x_i for $1 \leq i \leq r$ be the distinct elements of a subset X of \mathbb{F}_p^\times such that
$$\{x_i + x_j \mid 1 \leq i < j \leq r\}$$
equals \mathbb{F}_p^\times as a multiset.
The set X is a coset of squares modulo 11. (MOAWOA 2019)

8. A prime in music is the unit and always perfect, whereas in mathematics it is neither a unit nor perfect.
9. Trust in cognates, even proper ones, when speaking a foreign language can be misplaced as indicated by the words 'globaal' and 'global', and 'overall' and 'overall' in respectively Dutch and English.

Propositions 5, 6 and 7 are respectively a problem, the main idea behind a problem and a reformulation of a problem which were selected for the indicated mathematical contests.