Research topics Maths&Languages 2017-2018
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Subject 1: Distances on earth

How many points can one place on earth so that the distance between two of them is at least 10000 km?

Subject 2: All the stones on the white face

Consider a game board with n columns and m rows. In each case, there is a stone with a white face and a black face. Every time a case is chosen, all the stones around except the one chosen are reversed. With that rule and starting from a situation where all the stones are on the black face, is it possible to reverse all the stones on the white face?

Subject 3: Divisibility and last digits

You are familiar with the divisibility rule for 2: a natural number is divisible by 2 if and only if its last digit is one of: 0, 2, 4, 6 or 8. This means in particular, that the divisibility of n by $k=2$, depends on the last digit of n. This is not the case when speaking of divisibility by 4, but it's easy to convince, that the divisibility of n by $k=4$ depends on two last digits of n.

Find **all** such numbers $k>1$, that the divisibility by k depends on the last digit of the divided number. For each l, find **all** such numbers $k>1$, that the divisibility by k depends on l last digits of the divided number.