MATH BATTLE!

MAR 17, 2019

1. Below you can find translations of some English sentences into Hawaian:

He has seven big brothers	Ehiku ona kaikuaana
Mary has one brother	Ekahi o Mele kaikunane
He has one little brother	Ekahi ona kaikaina
Mary has no big sisters	Aohe o Mele kaikuaana
John has one sister	Ekahi o Keone kaikuahine
I have one canoe	Ekahi ou waa
She has no little sisters	Aohe ona kaikaina

Translate from Hawaian: "Aohe ou kaikuaana"

2. Rhino's skin has vertical and horizontal folds on its sides, 17 in total. If Rhino rubs one of its sides against a tree, then either two horizontal or two vertical folds on this side disappear, but two folds, one horizontal and one vertical, appear on the other side. (If there are less than two horizontal folds and less than two vertical folds, then nothing happens.)

   Can it happen that the numbers of vertical and horizontal folds on each of Rhino's sides have been interchanged after Rhino scratched its sides several times? (e.g., if on his left side there were 3 horizontal and 3 vertical folds, then it would become 3 vertical and 3 horizontal, and similarly for the other side.)

3. Let $n = 10^{20} - 2^{20}$. Without using a calculator, find how many 2's will there be in the prime factorization of n?

4. Mother baked 15 pastries. She placed them on a round plate in a circle: 7 with cabbage, 7 with meat, and one with cherries in that exact order and put the plate into a microwave. All pastries look the same but Olga knows the order. However she doesnt know how the plate has been rotated in the microwave. She wants to eat a pastry with cherries. Can Olga eat her favourite pastry for sure if she is not allowed to try more than three other pastries?