

Graham verbal Olympiad 10/19/22

1. A duckling and a gosling were participating in a triathlon competition. The distances for running, swimming, and flying was the same. Duckling ran, swam, and flew with the same speed. The gosling ran twice as slow as the duckling but swam twice as fast as the duckling. Who should fly faster and by how much, so they start and finish at the same time?
2. Nineteen witches, all of different heights, stand in a circle around a campfire. Each witch says whether she is taller than both of her neighbors, shorter than both, or in-between. Exactly three said "I am taller." How many said "I am in-between"?
3. Find two numbers that aren't divisor of each other, their GCD is 50, and their LCM is 1000.
4. 7 points A, B, C, D, E, F , and G are selected on a line, such that

$$AB = 1, BC = 2, CD = 3, DE = 4, \\ EF = 5, FG = 6, GA = 7.$$

Find the arrangement of the points so the distance between the leftmost and the rightmost points is maximal.

5. Integer numbers from 1 to 100 are each colored in one of the three color. Prove that there are two different numbers of one color, such that their difference is a square of an integer (e.g. 1, 4, 9, 16, 25, etc.).

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