GMC Sample Problems

"Dedicated Students from Gunn High School"

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1 Sample Problems

Division A is generally going to be Jalapeño to Habanero, whereas Division B is generally going to be Sweet Bell to Cayenne. We don't know what the Wild Card problem is.

- (Sweet Bell) Let $a \oplus b = ab + 1$. Compute $3 \oplus (4 \oplus 5)$
- (Jalapeño) A box holding 32 identical chocolates weighs 680 grams. Once we remove 9 chocolates, the box now weighs half a kilogram. How much does the box weigh on its own?
- (Jalapeño) Richard drops a ball from a height of 12 feet and it bounces. Each bounce is $\frac{2}{3}$ the height of the bounce before. Find the total vertical distance, in feet, the ball is going to travel.
- (Cayenne) An integer n has 302481 digits in base-9261. What is the difference between the largest and smallest number of digits that n could have in base 21?
- (Habanero) Let S be the sum of all 25-digit numbers containing 1 1, 2 2s, 3 3s, 4 4s, 5 5s, 4 6s, 3 7s, 2 8s, and 1 9. Find the largest k such that 3^k divides S.
- (Wild Card) The value of the expression $1 * 9 * 881 * 41$ can be expressed in the form $a^b - c^b$ such that a, b, and c are all positive integers and b is maximized. Find $a + b + c$.