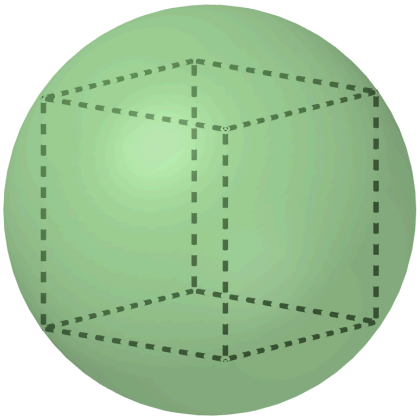
SJA MATHEMATICS CONTEST I

Advanced Division Sample Questions

1. A cube is inscribed in a sphere with a radius of 4. The volume inside the sphere but outside the cube can be represented in a form $\frac{a\pi - b\sqrt{c}}{9}$, where c is a positive prime number. Find $a - b + c$.



(A) 237 **(B)** 240 **(C)** 249 **(D)** 253 **(E)** 259

2. Four after school activities - math club, science club, art club, and soccer club - sit at a circular table. There are 3 students in the math club, 2 students in the science club, 1 student in the art club, and 2 students in the soccer club. Each club sits together as a group and the science club never sits next to the math club. How many different seating arrangements are possible?

(A) 2 **(B)** 14 **(C)** 26 **(D)** 48 **(E)** 50

3. For some positive integer n, the number $170n^3$ has exactly 170 positive integer divisors, including 1 and the number $170n^3$. k is the ones digit of n. Find the sum of all possible k.

(A) 8 **(B)** 9 **(C)** 10 **(D)** 11 **(E)** 12