**Algebra Challenge Rules**

**General Concept**: Teams of 2 compete to find the most ways to express a number given a set of 3 variables.

**Materials:**

* pencils
* printer paper
* answer sheets (available on Science Synergy website)
* stopwatches (used by event supervisors)

All materials will be provided at competition.

**Time:** 10 minutes

**Section 1: Competition:**

* Judges distribute sheets of blank printer paper and an answer sheet to each group. The sheets of printer can be used as scrap paper, but only the answer sheet will be graded.
* Judges announce a number between 30 and 50 and define three different variables. The variables have to equal numbers between 2 and 9.
* *Using only the variables that are defined*, students have to express the announced number in the most ways possible within the time restraint.
* Participants are restricted to using the following operations:
  + Addition
  + Subtraction
  + Multiplication
    - Exponentiation
  + Division
    - Roots (square roots, cube roots, etc.)
* The team with the greatest number of ways to express the given number wins.

**Section 2: Sample Question**

Variables: a = 2, b = 3, c =5

Number: 33

1. b3 + 2a
2. a5 + (b-a)
3. abc + b
4. c2 + a3
5. b(a+b+c) + b
6. bc+ac+b+c

**Section 3: Scoring**

Number Score (NS) = Number of expressions recorded on the answer sheet.

Total Score (TS) = NS