Middle Equations® Variations 2008-9

1. Sideways A cube representing a non-zero number may be used sideways in the Goal or Solution to equal the reciprocal of that number.

2. Upside-down A cube representing a number may be used upside-down in the Goal or Solution to equal the additive inverse of that number.

3. 0 wild The 0 cube may represent any symbol on the cubes, but it must represent the same symbol everywhere it occurs (Goal and Solution). Each Solution-writer must specify in writing the interpretation of the 0 cube if it stands for anything other than 0 in his Solution.

4. Factorial There are two occurrences of the factorial operator (!) available, like parentheses, to be used in the Solution *and/or the Goal* as the Solution-writer chooses to use them. All uses of ! in the Solution must be in writing.

5. Multiple operations Every operation sign in Required or Permitted may be used many times in any Solution. If the factorial variation is also chosen for the shake, an unlimited number of factorial operators may be used in each Solution. At most two factorials may be used in the Goal.

6. Base *m* Both the Goal and the Solution must be interpreted as base *m* expressions, where the player choosing this variation specifies *m* for the shake as eight, nine, or ten. Two-digit numerals are allowed in Solutions.

7. Exponent Any numeral on a ___ cube may be used as an exponent without being accompanied by an * cube. The player selecting this variation fills the blank in the previous sentence with one of the colors red, blue, green, or black.

8. Average + shall not represent addition; instead it shall represent the operation of averaging *two* numbers.

9. Number of factors x*A* means "the number of counting number factors of *A*," where *A* is a counting number.

10. Powers of the base 1 (one) may represent any integral power of ten. (If 1 is used in a two-digit numeral, it stands for 1.) If base *m* is also chosen, 1 represents any integral power of *m*.

DO NOT MARK THIS SHEET!