

Michigan League of Academic Games Middle Equations Variations 2011-12

NOTE: In Adventurous, up to six cubes may be used to create a Goal

The following may be used in September and October

Sideways Cube: A cube representing a non-zero number may be used sideways in the Goal or a Solution to equal the reciprocal of the number it represents

Upside-Down Cube: In the Goal or a Solution, any numeral may be used upside-down to equal the additive inverse of the number represented by that numeral

0 Wild: The 0 cube may vary and equal any numeral on the cubes, but it must equal the same numeral everywhere it occurs (Goal and Solution). The interpretation of the 0 cube in the Solution is specified in writing by each player who has the burden of proof as part of the Solution. If a 0 stands for 0 in a Solution, this fact need not be specified in writing. A 0 in the Goal and a 0 in the Solution must stand for the same thing.

Factorial (!): There are two occurrences of the factorial operator (!) available, like parentheses, to be used in a Solution, and/or to modify the Goal. All uses of ! in a Solution must be in writing. The player with burden of proof must explain uses of ! in the Goal.

Two-digit numerals: Two-digit numerals are allowed in Solutions.

Any Color Exponent: The player who picks this variation names the color. The numerals on that color cube may be used as an exponent without an * or ^ cube.

The following may be added in November

Percent: $\%$ means "percent of." That is, $A \% B = A\%$ of B, where A and B are numbers. In the Goal or a Solution, A and/or B may be a two-digit numeral.

Decimal point: * or ^ may be used as a decimal point. If so used in the Goal or a Solution, a * or ^ may be combined in a numeral with at most three digits. When used as a decimal, * or ^ takes precedence over all other operations.

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 a whole number from eight to ten, inclusive. Two-digit numerals are allowed in Solutions when this variation is called.

Number of factors: x may be used to indicate the number of counting number factors of a counting number, including the number itself and one. That is, $x_A =$ the number of factors of A, where A is a counting number ≤ 200 .

AB+: The Goal and/or the Solution may be or may include a three-cube expression of the form AB+. AB+ is interpreted as a repeating decimal. It may be interpreted as .ABABAB... or as .ABBBBB... A player who presents a Solution is correct if the Solution satisfies either interpretation of the Goal.