Elementary Equations® Variations 2017-18

Note   {counting numbers} = {natural numbers} = {positive integers} = {1, 2, 3, 4, ...}
        {whole numbers} = {0, 1, 2, 3, 4, ...}

GENERAL RULE   If ^ (or *) is used for raising to a power, both base and exponent must be whole numbers. If √ is used for the root operation, the index must be a counting number, and the base and total value must be whole numbers.

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

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

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

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

5. <u>Multiple operations</u> Any operation sign not in Forbidden (or the Goal) 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. <u>Three-operation Solution</u> Any Solution must contain at least three operation symbols. The operation symbols are +, –, x, ÷, ^ (or *), √, and ! if Factorial is chosen.

7. <u>Remainder</u> *A* ·I· *B* (·I· is a sideways ÷) equals the remainder when *A* is divided by *B*. *A* and *B* are positive integers, and *A* is less than or equal to 1000.

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

9. <u>Smallest prime</u> x*A* means "the smallest prime bigger than *A*," where *A* is a rational number less than or equal to 200.

10. <u>Percent</u> —ᐟ means "percent of." That is, *A* —ᐟ *B* = *A*% of *B* where *A* and *B* are numbers. In the Goal or Solution, *A* and/or *B* may be a two-digit numeral.

11. <u>Decimal point</u> ^ (or *) may represent a decimal point. If so used in the Goal or Solution, a ^ may be combined with at most three digits to form a numeral. When used as a decimal, ^ takes precedence over all other operations.

DO NOT MARK THIS SHEET!