

## NOAGL Elementary Equations® Variations 2012

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  $\sqrt{\quad}$  is used for the root operation, the index must be a counting number, and the base and total value must be whole numbers.

### The following variations may be chosen beginning at Round ONE.

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 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. **Factorial** 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. **Two-digit Numerals** Two-digit numerals are allowed in Solutions.
6. **Three-operation Solution** Any Solution must contain at least three operation symbols. The operation symbols are +, −, ×, ÷, \* (or ^),  $\sqrt{\quad}$ , and ! if Factorial is chosen.
7. **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.

### The following variations may be chosen beginning at Round TWO.

8. **Remainder**  $A \cdot \cdot B$  ( $\cdot \cdot$  is a sideways  $\div$ ) equals the remainder when  $A$  is divided by  $B$ .  $A$  and  $B$  are positive integers, and  $A$  is less than or equal to 1000.
9. **Smallest Prime**  $x_A$  means “the smallest prime bigger than  $A$ ,” where  $A$  is a rational number less than or equal to 200.
10. **Percent**  $\sqrt{\quad}$  (upside-down radical) means “percent of.” That is,  $A \sqrt{\quad} B = A\%$  of  $B$  where  $A$  and  $B$  are numbers. In the Goal or Solution,  $A$  and/or  $B$  may be a two-digit numeral.
11. **Decimal Point** \* (or ^) may represent a decimal point. If so used in the Goal or Solution, an \* (or ^) may be combined with at most three digits to form a numeral. When used as a decimal, \* (or ^) takes precedence over all other operations.

**DO NOT MARK THIS SHEET!**

## EQUATIONS/ON-SETS SCORING CHART

### Scoring During a Shake

Situation	Correct	Incorrect
Challenge Now <i>or</i> Never	6	2
Challenged against (Last Mover)	6	2
Third Party siding with Challenger	4	2
Third Party siding with Last Mover	6	2
Write a Solution after all cubes moved	4	2

**Note** A student who is late or absent for a shake scores -4 for that shake.

### Scoring at the End of a Match (Round)

Three-Player Match	
1 <sup>st</sup> place alone	6
Two-way tie for 1 <sup>st</sup>	5
Three-way tie for 1 <sup>st</sup>	4
2 <sup>nd</sup> place alone	4
Two-way tie for 2 <sup>nd</sup>	3
Third place alone	2
Did not play	0

Two-Player Match	
1 <sup>st</sup> place alone	6
Two-way tie for 1 <sup>st</sup>	5
2 <sup>nd</sup> place alone	4
Did not play	0