MLAG High School Intermediate Tournament Rules 2019-20

I. Equations

For High School Intermediate players, Equations is played with all the rules listed in the Basic Equations Tournament Rules and the three adventurous variations listed below. Those three variations are in effect for all shakes.

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

  Examples 1 + 2 +  = 1 + 2 + 0.5 = 3.5;

  1 ÷  = 1 ÷ (1/3) = 1 x 3 = 3

  Comment See the Adventurous Equations Appendix for ways to indicate a sideways cube in an Equation.

- 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.

  Examples 6 x  = 6 x (–2) = –12. However, 6 is *not* legal for 6 – 2 or 60 + (–2).

  Comment See the Adventurous Equations Appendix for ways to indicate a sideways cube in an Equation.

  Note: The Sideways rule and the Upside-down rule may be used on a single-digit numeral at the same time if both variations have been selected, but only in a Solution

  Examples 3 = -⅓; 8 = -⅛

  sw *sw*

  ud *ud*

- 0 Wild: The 0 cube may represent any *symbol* (numeral or operation) on the cubes, but it must represent the same symbol 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.

  Examples

  (a) (0 x 6) – 0 = 15, where both 0's stand for 3, is allowed but (0 x 6) – 0 = 14, where the first 0 stands for 3 and the second for 4, is *not* allowed.

  (b) (0 x 6) – 0 = 12, where the first 0 stands for 2 and the second for 0, is *not* allowed.

  (c) A 0 in the Goal and any 0 in the Solution must equal the same number. So (8 x 5) + 0 equals the Goal 40 if each 0 equals 2. However, (9 x 5) – 0, where this 0 stands for 5, does *not* equal the Goal 40.

  Comments - If a player interprets 0 in the Goal as x, then any 0 in that player's Solution must also be an x.

II. On-Sets

For High School Intermediate players, On-Sets is played with all the rules listed in the Basic On-Sets Tournament Rules with restrictions (see rules below) and three adventurous variations listed below. Those three variations are in effect for all shakes.

A. Restrictions – A restriction is presented by a solution writer along with their Set-Name. A solution writer is not required to present a restriction with their Set-Name, unless a restriction cube (= or C) is placed in Required. Restiction cubes may not be placed in Forbidden.

1. A *Restriction* is a rule that is applied to the cards in the Universe. Any card that does not satisfy the Restriction is temporarily removed from the Universe while that Solution

is being checked. After all Restrictions in the Solution have been applied to the Universe, the Solution-writer's Set-Name is worked out using the cards that remain in the restricted Universe.

Comments

(a) Any cards removed while checking a Solution are returned to the Universe before another Solution is checked.

(b) Any Restrictions in a Solution apply to the Universe only for *that* Solution.

2. There are three types of Restrictions. Any set used in each type must be represented by a legal Set-Name.

a. *Subset Restriction*: this type has the form *Set 1* $\subseteq$ *Set 2*. A card in the Universe does not satisfy a subset Restriction if it is in *Set 1* but not in *Set 2*.

Examples B $\subseteq$ R', G – Y $\subseteq$ Λ, B – R $\subseteq$ (G ∩ V)', B U Y $\subseteq$ B U Y

b. *Equals Restriction*: this type has the form *Set 1 = Set 2*. A card in the Universe does not satisfy the Restriction if it is in one of the two sets but not in the other.

Examples B = R, G – Y = V, (B ∩ G)' = Y – R, R = R

c. *Chain Restriction*: this type has two or more = or $\subseteq$ cubes in it.

(i) Restrictions of the following form are defined, where *A*, *B*, and *C* are sets.

A $\subseteq$ *B* $\subseteq$ *C* (meaning *A* $\subseteq$ *B* and *B* $\subseteq$ C)
A = *B* = *C* (meaning *A* = *B* and *B* = *C*)
A $\subseteq$ *B* = *C* (meaning *A* $\subseteq$ *B* and *B* = *C*)
A = *B* $\subseteq$ *C* (meaning *A* = *B* and *B* $\subseteq$ *C*)

(ii) Restrictions of the following form also are permitted, where each one is worked out from left to right like those above.

A $\subseteq$ *B* $\subseteq$ *C* $\subseteq$ *D*, *A* = *B* = *C* = *D*, *A* $\subseteq$ *B* $\subseteq$ *C* = *D*, *A* = *B* $\subseteq$ *C* $\subseteq$ *D*, and so on.

3. In a Restriction, no pair of parentheses (or other symbols of grouping) may enclose an = or $\subseteq$ symbol. However, a player may put parentheses around one side of a Restriction, like this: B $\subseteq$ (R U G).

Comment A common error is putting parentheses around part of a chain Restriction, like this where *A*, *B*, and *C* are sets: (*A* $\subseteq$ *B*) $\subseteq$ *C*, *A* = (*B* = *C*), and so on. Such parentheses make the chain meaningless just as the parentheses in the algebraic equation (2x=3)+7 make it meaningless. Also these parentheses are inappropriate: (B = R)' However, this does not mean that parentheses may not be used at all in Restrictions. Parentheses may legitimately be placed within any Set-Name in a Restriction, as in the following examples.

(R U B) – G = V, B = (G U R)' $\subseteq$ V, R' = B $\subseteq$ (R – Y) U V

Notice in these examples that no pair of parentheses encloses an = or $\subseteq$.

B. Variations – The following variations will be in effect for all shakes

- U and ∩ Interchangeable Any U may represent U or ∩, and any ∩ may represent ∩ or U.

Comments

(a) U and ∩ need not be used consistently. In a Solution, one U (or ∩) may be used as U and another U (or ∩) used as ∩.

(b) Any wild cube used as U or ∩ gains the full interchangeable power granted U and ∩ by this variation.

(c) If U (or ∩) Wild and U-∩ Interchangeable are both chosen for a shake, then, if U (or ∩) is used just for itself or ∩, it need not be used consistently. However, if U (or ∩) is used for any symbol other than U or ∩, then it must represent that same symbol throughout the Solution.

(d) Since this variation makes U and ∩ "wild" in only a limited way, players are *not* required to indicate in writing where in the Solution a U stands for ∩ or a ∩ stands for U. They should simply write the symbol they want mathematically.

(e) If U Wild is also called, this does not mean ∩ cubes are wild and vice-versa.

- V and Λ Interchangeable Any V may represent V or Λ, and any Λ may represent Λ or V.

Comment The comments above for U and ∩ Interchangeable, substituting V for U and Λ for ∩, apply here.

- Multiple Operations Every operation sign in Required, Permitted, or Resources may be used multiple times in any Solution.

Comments

(a) After an Impossible challenge, any operation sign in Resources may be used many times in any Solution. After a Now challenge, if the one cube allowed from Resources is an operation cube (or a wild cube used as an operation), it may be used multiple times.

(b) With this variation, an operation cube is not used to represent another symbol. So, players may simply write an operation sign multiple times in Solutions without any additional comment.