

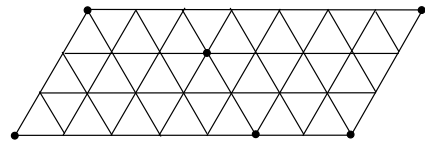
I U P U I

MATH CLUB TEASER #29

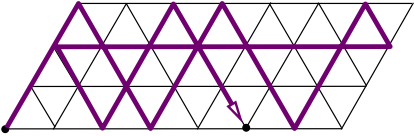
October 2, 2009
(due October 9, 2009)

SOLUTION

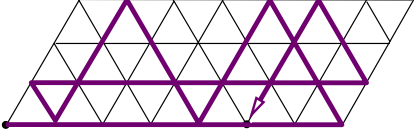
In this diagram, every point has coordinates $(\backslash, /, -)$ representing the contents of the $(10L, 7L, 3L)$ containers. For illustration, the marked points are $(10, 0, 0)$, $(7, 0, 3)$, $(5, 3, 2)$, $(5, 5, 0)$, $(3, 7, 0)$, and $(0, 7, 3)$ from left to right.



Obviously, the coordinates must add to 10 at all times. Also, a transfer between containers must go on until one is empty or the other is full. In the diagram, this means tracing a straight path until reaching the border. Here are the two shortest solutions:



$(10, 0, 0) \rightarrow$
 $(7, 0, 3) \rightarrow (7, 3, 0) \rightarrow$
 $(4, 3, 3) \rightarrow (4, 6, 0) \rightarrow$
 $(1, 6, 3) \rightarrow (1, 7, 2) \rightarrow$
 $(8, 0, 2) \rightarrow (8, 2, 0) \rightarrow$
 $(5, 2, 3) \rightarrow (5, 5, 0)$ in 10 steps.



$(10, 0, 0) \rightarrow$
 $(3, 7, 0) \rightarrow (3, 4, 3) \rightarrow$
 $(6, 4, 0) \rightarrow (6, 1, 3) \rightarrow$
 $(9, 1, 0) \rightarrow (9, 0, 1) \rightarrow$
 $(2, 7, 1) \rightarrow (2, 5, 3) \rightarrow (5, 5, 0)$
in 9 steps.

SOLVED BY:

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