MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 1 - OCTOBER 2013
ROUND 5 INEQUALITIES & ABSOLUTE VALUE

ANSWERS

A) _____

B) _____

C) _____

A) Let $y = \begin{cases} \dfrac{|n|}{n} & \text{for } n \neq 0 \\ c & \text{for } n = 0 \end{cases}$, where n denotes an integer and c denotes a real number.

If $\sum_{n=-1}^{n=2013} y = 0$, compute c.

[Fear not! Σ is the summation symbol.

By way of example, $\sum_{n=3}^{n=5}(2n-1) = (2\cdot 3-1)+(2\cdot 4-1)+(2\cdot 5-1) = 5+7+9 = 21.$]

B) Solve for x: $|2x+1| > |x-5|$

C) Determine <u>all</u> real values of x for which each of the fractions $\dfrac{1}{x+5}, \dfrac{1}{13x-60}, \dfrac{1}{5-x}$ are positive and the sequence formed by these three fractions is in strictly increasing order, namely $\dfrac{1}{x+5} < \dfrac{1}{13x-60}$ and $\dfrac{1}{13x-60} < \dfrac{1}{5-x}$.