MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 – FEBRUARY 2013 SOLUTION KEY

Round 4

A) If 85% is left, then 15% was removed. Thus, $N^2 = 0.15(15) = \frac{15^2}{100} \Rightarrow N = \underline{\mathbf{1.5}}$.

B) Let $(R, G) = (5x, 3x)$ initially. Then: $8x = 504 \Rightarrow x = 63$ and there are 315 red jelly beans and 189 green jelly beans at the outset. We require that
$\frac{315-2x}{189-x} = \frac{3}{5} \Rightarrow 1575 - 10x = 567 - 3x \Rightarrow 7x = 1008 \Rightarrow x = 144$
Thus, there are 315 – 288 = 27 red jelly beans and 189 – 144 = 45 green jelly beans, for a total of **72** jelly beans.

C) Let B and M denote votes for Boris and Miles respectively.
$M - 1$ must be divisible by $21 \Rightarrow (M, B) = \cancel{(22,25)}, \cancel{(43,50)}, (64,75) \Rightarrow \underline{\mathbf{139}}$ votes cast.

Check: This is the first total that exceeds 100. 8% of 75 votes is 6 votes. If Boris loses 6 votes then, instead of a 75 to 64 victory for Boris, the results become a 70 to 69 victory for Miles, a one vote differential as required.