MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 1 - OCTOBER 2013
ROUND 3 ALG 1: LINEAR EQUATIONS

ANSWERS

A) _____

B) _____

C) _____

A) Given: $\overleftrightarrow{AB}$ has its *x*-intercept at *P*(8, 0) and its *y*-intercept at *Q*(0, –6).
Determine the equation of the line parallel to $\overleftrightarrow{AB}$ that passes through *R*(2, 15) in standard form $Ax + By = C$, where $A > 0$, *A*, *B* and *C* are integers and their greatest common divisor is 1.

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B) Given: $\begin{cases} x = 2t + 1 \\ y = 6t - 5 \end{cases}$, where *t* denotes any real number
This set of equations is equivalent to a linear function defined by the linear equation $y = mx + k$, where *m* and *k* are constants. For a unique value of *k*, this line passes through the point $(x, y) = (k, 5k)$. Compute *k*.

C) The star field on a flag contains 40 stars arranged in horizontal rows, alternating between long and short rows. A long row contains 3 more stars than a short row. If the top and bottom rows are long rows and the total number of rows is no more than 10, how many stars are there in any two consecutive rows?