MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 6 – MARCH 2007
ROUND 1 ALG 2: SIMULTANEOUS EQUATIONS AND DETERMINANTS

ANSWERS

A) $a =$ _____ $b =$ _____

B) _____

C) _____

A) Determine the values of a and b such that the solution (x, y) of the system $\begin{cases} ax + by = 5 \\ ax - by = 15 \end{cases}$ is (5, 15).

B) Determine the numerical value of $\begin{vmatrix} 3 & a \\ b & 4 \end{vmatrix}$ if the system of equations represented by $\begin{bmatrix} 3 & a \\ b & 4 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ -6 \end{bmatrix}$ intersect at the point $P(5, 1)$.

C) The identity $\frac{A}{x} + \frac{B}{2x-1} + \frac{C}{x+3} \equiv \frac{-21}{2x^3 + 5x^2 - 3x}$ is true for exactly one ordered triple (A, B, C). Determine the value of $A + B + C$.