MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 - FEBRUARY 2015
ROUND 2 ARITHMETIC / NUMBER THEORY

ANSWERS

A) _____ $(base\ 5)$

B) _____

C) _____

A) Given: $a_{(base\ 5)} = 1011010_{(base\ 2)} + 1111111_{(base\ 2)}$

Compute $a_{(base\ 5)}$.

B) The sum of three consecutive positive integers a, b and c, where $a < b < c$, is divisible by both 6 and 15. Compute the <u>sum</u> of the three <u>smallest</u> possible values of a.

C) Let $A = 125 \cdot (45)^x$ and $B = 18 \cdot (24)^x$, where x is a positive integer.

Let $n(K)$ denote the number of divisors of K.

Determine <u>all</u> possible values of x for which $\frac{n(A)}{n(B)} = \frac{3}{4}$.