

**MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 6 - MARCH 2012
ROUND 2 ALG1: EXPONENTS AND RADICALS**

ANSWERS

A) (_____ , _____)

B) _____

C) (_____ , _____ , _____)

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| ***** NO CALCULATORS IN THIS ROUND ***** |
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A) For positive integers k and A , $A^2 = 6000k$.

Compute (k, A) , where k is the smallest integer for which the ordered pair satisfies the equation.

B) Let $L = \frac{0.125}{2}$. For many integers P and Q , $2^{-P} < L$ and $3^{-Q} < L$.

Compute the minimum value of $P + Q$.

C) Usually radicals with different indices cannot be combined.

Given: A, B are positive integers and $A, B < 4$

Compute the ordered triple (N, C, X) , where N, C and X are positive integers and C is as small as possible, for which

$$\sqrt[12]{16(27)(128)(1024)} + 3\sqrt[4]{2^A 3^B} = N(\sqrt[C]{X})$$