

**MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 - DECEMBER 2010
ROUND 4 ALG 2: LOG & EXPONENTIAL FUNCTIONS**

ANSWERS

A) $n =$ _____

B) $x =$ _____

C) $x =$ _____

****** NO CALCULATORS ON THIS ROUND ******

- A) Compute n , if the coordinates of A , B and C are $\log 60$, $\log n$ and $\log 90$ respectively, and B is the midpoint of \overline{AC} .

- B) Solve for x .

$$5^{2\log_5 x} - 12\left(4^{\log_2 \sqrt{x}}\right) - 27^{\log_3 4} = 0$$

- C) Solve for all real numbers x satisfying the equation

$$100^x - 3 \cdot 2^{x+1} \cdot 5^x + 5 = 0$$

If necessary, an answer may be left as a simplified log expression.