MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 - DECEMBER 2011
ROUND 4 ALG 2: LOG & EXPONENTIAL FUNCTIONS

ANSWERS

A) (_____ , _____)

B) _____

C) _____

A) Let $f(x) = 2^{3x+1}$ and $g(x) = 4^x$. These exponential functions intersect at $P(a, b)$. Compute the ordered pair (a, b).

B) Let P denote a point represented by the coordinates of an x-intercept of $y = f(x) = \log_2\left(8(2x-1)^2\right) - 5$.
Let Q denote a point represented by the coordinates of a y-intercept of this function. Compute <u>all</u> possible distances PQ.

C) Given: $A = \log 2 + \log\frac{3}{2} + \log\frac{4}{3} + \ldots + \log\frac{2000}{1999}$ and $\log_{1024} 10 = k$
Express A as a simplified <u>ratio</u> in terms of k.

Note: log denotes common logs, i.e. $\log_{10}$.