MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 4 - JANUARY 2011
ROUND 3 TRIG: EQUATIONS WITH A REASONABLE NUMBER OF SOLUTIONS

ANSWERS

A) $k =$ _____

B) $x =$ _____

C) $x =$ _____

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

A) The positive solutions of $\tan(5x) = 1$ are arranged in a list in increasing order. The fourth value in the list is $k°$. Compute k.

B) Solve for x over $0 \leq x < \pi$. $\quad (\sin 2x)(\cos^4 x - \sin^4 x) = 0$

C) Solve for x over $\frac{\pi}{2} < x < \frac{5\pi}{2}$: $\quad \sin\left(2x + \frac{\pi}{4}\right) = \cos\left(\frac{7\pi}{4}\right)$