MASSACHUSETTS MATHEMATICS LEAGUE
JANUARY 2005
ROUND 3 TRIG: EQUATIONS WITH FEW SOLUTIONS

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

ANSWERS

A)_____

B)_____°

C)_____

A) Solve for $0 \le x < \pi$: $0 = (4\cos^2 x - 1)(4\cos^2 x - 3)(4\cos^2 x - 5)(4\cos^2 x - 7)(4\cos^2 x - 9)$

B) Given $\cot^3 z - \cot^2 z - \cot z = 2\cot z - 3$, $0° \le z < 360°$, find the <u>average</u> of all solutions for z .

C) Find the <u>exact</u> sum of all solutions θ , $0 \le \theta < 2\pi$ for

$$(\sin\theta - 0.35)(\tan\theta - 0.80)(\tan\theta - 1.25)(\sec\theta - 1.70) = 0$$