MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 – FEBRUARY 2014– ANSWERS

Round 1 Alg 2: Algebraic Functions

A) 20   B) –19, 9   C) $(0.5, 6.5, 2.5)$

(in any order)

Round 2 Arithmetic/ Number Theory

A) $(7, 1)$ B) 2016, 2058, 2100   C) 229

(in any order)

Round 3 Trig Identities and/or Inverse Functions

A) $(3\sqrt{3}, 6)$ B) 200, 340   C) $-\dfrac{7}{25}$

Round 4 Alg 1: Word Problems

A) 8   B) 15   C) (157, 136)

Round 5 Geometry: Circles

A) $\dfrac{108\pi}{25}$ (or 4.32π)   B) $\dfrac{2\sqrt{\pi}}{3}$ C) $\dfrac{112}{13}$

Round 6 Alg 2: Sequences and Series

A) $\dfrac{5}{3}$ B) 10   C) –5, 10, 25

Team Round

A) $0, \pm 1, \pm \dfrac{\sqrt{2}}{2}$ D) 10

B) 1   E) $30 + 9\sqrt{10}$ or $3\left(10 + 3\sqrt{10}\right)$

C) $-\dfrac{1}{6} \le x \le \dfrac{1}{3}$ or $\dfrac{1}{2} \le x \le 1$ F) 145

or $\left[-\dfrac{1}{6}, \dfrac{1}{3}\right], \left[\dfrac{1}{2}, 1\right]$