MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 - FEBRUARY 2017 ANSWERS

Round 1 Algebra 2: Algebraic Functions

A) $\dfrac{11}{4}$

B) 14

C) $(-3, -45), (7, 45)$

Round 2 Arithmetic/ Number Theory

A) 67, 103, 211

B) 34, 70 or 88

C) 41

Round 3 Trig Identities and/or Inverse Functions

A) $\dfrac{1}{1 - \sin^2 x}$

B) $0, \pi, \dfrac{\pi}{4}, \dfrac{3\pi}{4}, \dfrac{5\pi}{4}, \dfrac{7\pi}{4}$

C) $-\dfrac{\sqrt{3}}{2}$

Round 4 Algebra 1: Word Problems

A) $\dfrac{100}{3}$ or $33\frac{1}{3}$

B) 0.08 mph (or $\dfrac{2}{25}$)

C) $\dfrac{4}{625}$

Round 5 Geometry: Circles

A) 24

B) 36π

C) $\dfrac{47}{7}$

Round 6 Algebra 2: Sequences and Series

A) 240

B) 9

C) 171

Team Round

A) $(3, -4)$

D) $(13.75, 1512.50)$

B) 20

E) $\left(3 - 2\sqrt{3}, \dfrac{3 - \sqrt{5}}{2}, \dfrac{11 - 2\sqrt{10}}{9} \right)$

C) 0, 180, 45, 135, 225, 315

F) 5, 12, 14, 15, 32