

**MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 5 – FEBRUARY 2007
ROUND 1 ALG 2: ALGEBRAIC FUNCTIONS**

ANSWERS

A) _____

B) _____

C) _____

A) Determine the domain of the function $f(x) = \frac{1}{\sqrt{4x - 3x^2}}$.

B) Given: $f(0) = 0$ and $f(x) = x - f(x - 1)$ for $x > 0$
Find $f(2007)$.

C) Find the largest 3-digit integer (in base 10) that can be formed from the distinct digits A , m and b , given:

$$f(x) = Ax^2 \text{ and } g(x) = mx + b, \text{ where } A \neq 0 \text{ and } m \neq 0$$

$$f(g(x)) \equiv g(f(x)) \text{ (i.e. an identity valid for all real values of } x \text{)}$$