

**MASSACHUSETTS MATHEMATICS LEAGUE**  
**FEBRUARY 2006**  
**ROUND 1 ALGEBRA 2: ALGEBRAIC FUNCTIONS**  
**ANSWERS**

A)\_\_\_\_\_

B)\_\_\_\_\_

C)\_\_\_\_\_

A) If  $f(x) = 2x^2 + 1$ , express  $f(2y^2 + 1)$  as a simplified expression in terms of  $y$ .

B) Suppose  $G(x) = 2x^2$  and  $F(x) = 1 - 3x$ . Find all  $x$  for which

$$F(G(x)) - G(F(x)) = x.$$

C) Given  $h(x) = 2x + 1$ , and  $g(x) = 3 - 2x$ , find all  $x$  for which  $h^{-1}(x) + g^{-1}(x) = \frac{h(x) \cdot g(x)}{h(x) + g(x)}$ .