

**MASSACHUSETTS MATHEMATICS LEAGUE**  
**CONTEST 1 - OCTOBER 2015**  
**ROUND 4 ALG 1: FRACTIONS & MIXED NUMBERS**

**ANSWERS**

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

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

C) ( \_\_\_\_\_ , \_\_\_\_\_ )

A) For certain values of the integer constants  $A$  and  $Y$ ,  $\frac{21-A}{52} = \frac{Y}{4}$ . If  $\frac{Y}{4}$  is a positive proper fraction in simplified form, compute all possible ordered pairs  $(A, Y)$ .

B)  $\frac{20x+k}{2x^2-x-3} = \frac{A}{2x-3} + \frac{B}{x+1}$  is an identity in  $x$  ( $A, B$  and  $k$  are constants).  
Compute  $k$ , if  $A : B = 4 : 3$ .

C) While making a long drive on Interstate I-95, Dick occasionally checked his odometer. It read 12345 at 1:10 PM and  $126\blacklozenge 1$  at 5:55 PM. The tens digit  $d$  was obscured by an annoying insect ( $\blacklozenge$ ). If Dick was driving at a steady speed of  $k$  mph, for some integer  $k$ , compute the ordered pair  $(k, d)$ .