MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 1 - OCTOBER 2007 SOLUTION KEY

Round 3

A) $a(a - 2x) = b(b + 2x) \rightarrow a^2 - b^2 = 2bx + 2ax \rightarrow (a + b)(a - b) = 2x(a + b) \rightarrow x = \boxed{\frac{a - b}{2}}$

B) Solving for y in terms of $x \rightarrow y = 65 - 3x$. Clearly, for $x = 1 \ldots 21$, y will be a positive integer. Thus, there are **21** solutions.

C) Assume 12 eggs cost $x¢$ and 16 cost $(x + 32)¢$ or $\frac{3}{4}(x + 32)$ ¢/dozen

Then $\frac{3}{4}(x + 32) = x - 4 \rightarrow 3x + 96 = 4x - 16 \rightarrow x =$ **112 or $1.12**