MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 2 – NOVEMBER 2013 SOLUTION KEY

Round 2

A) $0.63(16) = 0.36(x+16) \Leftrightarrow 0.36x = 16(0.63-0.36)$
Multiplying through by 100, $36x = 16(63-36) = 16(27)$
Therefore, $x = \dfrac{16(27)}{36} = \dfrac{16(3)}{4} = \underline{\mathbf{12}}$.

B) Dick: x $\quad 46x + 23y = 1288$
Joe: y $\quad x = 3y$
$46(3y) + 23y = 1288 \Rightarrow 161y = 1288 \Rightarrow y = 8, x = 24$
The difference is $24(0.46) - 8(0.23) = 0.23(48-8) = 0.23(40) = \underline{\mathbf{\$9.20}}$.

C) $f(x) = 5x - 3 \Rightarrow \dfrac{f(x+h) - f(x-h)}{h} = \dfrac{5(x+h) - 3 - \big(5(x-h) - 3\big)}{h} = \dfrac{10h}{h} = 3h - 8 \Rightarrow 3h = 18 \Rightarrow h = \underline{\mathbf{6}}$