Finite Mathematics (Fall 2008) – Solutions to Quiz 3

1. (5) Solve the following inequality. Express the solution using interval notation, and also show the solution on the real number line. \[ \left| \frac{7 - 4x}{5} \right| \geq 3 \]

\[ \frac{7 - 4x}{5} \geq 3 \quad \text{or} \quad \frac{7 - 4x}{5} \leq -3 \]

\[ 7 - 4x \geq 3 \times 5 \quad 7 - 4x \leq -3 \times 5 \]
\[ -4x \geq 15 - 7 \quad -4x \leq -15 - 7 \]
\[ x \leq \frac{8}{-4} \quad x \geq \frac{-22}{-4} \]
\[ x \leq -2 \quad x \geq \frac{11}{2} \]

The solution set is \((-\infty, -2] \cup [11/2, \infty)\).

2. (5) Evaluate the following sum. Simplify your answer. \[ \sum_{k=1}^{n} (2k - n) \]

\[ \sum_{k=1}^{n} (2k - n) = \sum_{k=1}^{n} 2k - \sum_{k=1}^{n} n \]
\[ = 2 \sum_{k=1}^{n} k - n \sum_{k=1}^{n} 1 \]
\[ = 2 \left( \frac{n(n + 1)}{2} \right) - n \times n \]
\[ = n(n + 1) - n^2 = n^2 + n - n^2 \]
\[ = n \]