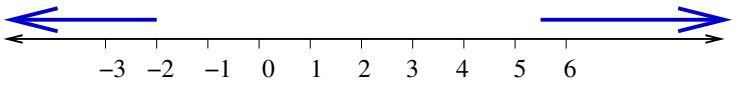
Finite Mathematics (Fall 2008) – Solutions to Quiz 3

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

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

$$\begin{array}{rcl} 7-4x & \geq & 3\times 5 \\ -4x & \geq & 15-7 \\ x & \leq & 8/-4 \\ x & \leq & -2 \end{array} \qquad \begin{array}{rcl} 7-4x & \leq & -3\times 5 \\ -4x & \leq & -15-7 \\ x & \geq & -22/-4 \\ x & \geq & 11/2 \end{array}$$

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



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

$$\begin{aligned} \sum_{k=1}^{n}(2k-n) &= \sum_{k=1}^{n}2k \;-\; \sum_{k=1}^{n}n \\ &= 2\sum_{k=1}^{n}k \;-\; n\sum_{k=1}^{n}1 \\ &= 2\left(\frac{n(n+1)}{2}\right) \;-\; n\times n \\ &= n(n+1)-n^2 = n^2+n-n^2 \\ &= n \end{aligned}$$