PROBLEM SET – Interpreting Inequalities
Mr. Peralta
Class 622 and 623

DIRECTIONS: Each situation below is accompanied by the inequality that best matches it. Use **full sentences** for each situation:

- STEP 1: Explain what the variable in each situation represents in terms of the problem
- STEP 2: Explain what each monomial in the inequality represents in terms of the problem
- STEP 3: Write a question that can be answered by finding a solution to the inequality
- STEP 4: Find two possible solutions to the inequality
- STEP 5: Find two possible numbers that are **not** solutions to the inequality
- STEP 6: Find the largest (or smallest) possible *integer* solution to the inequality

Situation A: The Garden Club is planting fruit trees in their school's garden. There is one large tree that needs 5 pounds of fertilizer. The rest are newly planted trees that need $\frac{1}{2}$ pound fertilizer each.

- INEQUALITY: $\frac{1}{2}x + 5 \leq 25$

Situation B: The Chemistry Club is experimenting with different mixtures of water with a certain chemical (sodium polyacrylate) to make fake snow. To make each mixture, the students start with some amount of water, and then add $1/7$ of that amount of the chemical, and then 9 more grams of the chemical. The chemical is expensive, so there can't be more than a certain number of grams of the chemical in any one mixture.

- INEQUALITY: $\frac{1}{7}x + 9 \leq 26.25$

Situation C: The Hiking Club is on a hike down a cliff. They begin at an elevation of 12 feet and descend at the rate of 3 feet per minute

- INEQUALITY: $12 - 3x \geq -37$

Situation D: The Science Club is researching boiling points. They learn that at high altitudes, water boils at lower temperatures. At sea level, water boils at 212 degrees F. With each increase of 500 feet in elevation, the boiling point of water is lowered by about 1 degree F.

- INEQUALITY: $212 - \frac{1}{500}e < 195$

Early Finisher: {3,4,5,6} is a set of four consecutive integers whose sum is 18.

1. How many sets of three consecutive integers are there whose sum is between 51 and 60? Can you be sure you've found them all? Explain or show your reasoning.

2. How many sets of four consecutive integers are there whose sum is between 59 and 82? Can you be sure you've found them all? Explain or show your reasoning.

Challenge Questions:

1. A square is drawn inside a rectangle. The ratio of the width of the rectangle to a side of the square is $2 : 1$. The ratio of the rectangle's length to its width is $2 : 1$. What percent of the rectangle's area is in the square?

2. The fraction $\dfrac{\left(3^{2008}\right)^2 - \left(3^{2006}\right)^2}{\left(3^{2007}\right)^2 - \left(3^{2005}\right)^2}$ is what in simplest form?

3. An equilateral triangle has side length 6. What is the area of the region containing all points that are outside the triangle but not more than 3 units from a point of the triangle?