Unit 1 Day 3 – Multiplication, Division of Integers Classwork Name: _____

Sometimes the chefs wanted to raise or lower the temperature by a large amount, but did not want to put the cubes into the cauldron one at a time. So for large jumps in temperature, they would put in or take out bunches of cubes.

For instance, if the chefs wanted to raise the temperature 100°, then they might toss five bunches of 20 hot cubes into the cauldron instead of 100 cubes one at a time. This saved a lot of time because they could have assistant chefs do the bunching.
When the chefs used bunches of cubes to change the temperature, they used a multiplication sign to record their activity. For example, to describe tossing five bunches of 20 hot cubes each into the cauldron, they would write $^{+}\mathbf{5} \bullet {}^{+}\mathbf{20} = {}^{+}\mathbf{100}$ where, $^{+}5$ meant that five bunches were being added, and the $^{+}20$ showed that there were twenty hot cubes in each bunch.

The chefs could also change the temperature by removing bunches. For example, if they removed three bunches of 5 hot cubes each, the result was to lower the temperature 15°, because each time a bunch of 5 hot cubes was removed, the temperature went down 5 degrees. To record this change, they would write $^{-}\mathbf{3} \bullet {}^{+}\mathbf{5} = {}^{-}\mathbf{15}$ where the $^{-}3$ meant that three bunches were being removed, and the $^{+}5$ showed that there were five hot cubes in each bunch.

1. Each of the problems below describes an action by the chefs. Figure out how the temperature would change overall in each of these situations *and* write an equation to describe the action and the overall result.
   a. Two bunches of 6 cold cubes each were added.

   b. Four bunches of 7 hot cubes each were removed.

   c. Three bunches of 6 cold cubes each were removed.

2. Describe the action involving hot or cold cubes that is represented by each of the following arithmetic expressions and state how the temperature would change overall.
   a. $^{-}10 \bullet {}^{-}5$

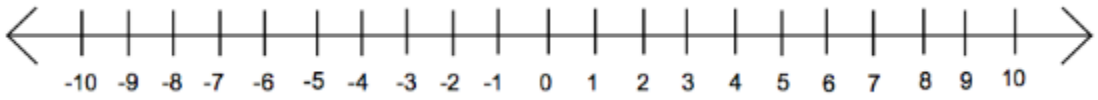
   b. $^{+}4 \bullet {}^{-}8$

3. Model this expression: $^{+}4 \bullet {}^{-}8$ using  $= 1$  $= -1$

Since multiplication is the same as repeated addition, how might we show the multiplication of integers using a number line?

4. Show how to do the following problem using a number line.

$^{+}3 \bullet {}^{-}2$



5. Write rules that might be used to multiply integers.

6. How could these same rules be used to divide integers? Why?

7. Use a different model to demonstrate each of the following:

a. $3 \times (-5)$ b. $(-3) \times 5$ c. $(-3) \times (-5)$