Modular Arithmetic Introduction

January 3, 2014

Name:_____Period:_____

PART 1: Take a few minutes to figure out the following three questions on your own.

1. Sometimes by labeling the numbers in a given statement, you can make a statement true that would normally be false. For example, the statement $12 + 2 = 3$ could be made true by labeling the numbers as follows: $12\ inches + 2\ feet = 3 feet$.

   By labeling the numbers in the statement $9 + 6 = 3$, make the statement true.

   9 + 6 = 3

2. A light bulb package says it has a life of 1000 hours. If the light we turned on right now and left on, at what time will it burn out?

3. What day of the week will it be 97 days from now?

* This assignment has been adapted from the "Modular Arithmetic on the Planet of the Eights" activity developed by Daniella Bak, Joanie Funderburk, Bill Metzler, and Lora Monfils of Rutgers University.

PART 2: ***You have crash-landed on the Planet of the Eights. This planet is a carbon copy of Earth, with one noticeable exception: the creatures on this planet have four fingers on each hand. The society functions around the number 8.***

Answer the following questions regarding life on the Planet of the Eights.

1. With the help of your classmates, determine how the inhabitants of the strange planet will measure time.

seconds in a minute:

minutes in an hour:

hours in a day:

days in a week:

weeks in a month:

days in a month:

months in a year:

2. Using your previous explanation, answer each of the following questions. Justify your answer.

   a. Octavius, an eight-year old boy on the Planet of the Eights, tells you his school day starts at 1:00 and lasts 5 hours. What time does he get home?

   b. If Olivia wants dinner to be ready at 2:00 and it takes 7 hours to bake, what time must she put it in the oven?

   c. Today is the first day of the week. Octavius celebrates his birthday in 15 days. What day of the week is his birthday?

   d. Today is the 2nd day of the 2nd month. What was the date 80 days ago?

PART 3: ***Once you fix your space ship, you decide to visit a neighboring planet where all the inhabitants have 14 fingers (7 on each hand). This new society functions around the number 14.***

Answer the following questions regarding life on this planet.

1. With the help of your classmates or on your own, determine how the inhabitants of the strange planet will measure time.

   seconds in a minute:

   minutes in an hour:

   hours in a day:

   days in a week:

   weeks in a month:

   days in a month:

   months in a year:

2. Using your previous explanation, answer each of the following questions. Justify your answer.

   a. Katorse, a fourteen-year old girl on this planet, tells you her school day starts at 1:00 and lasts 7 hours. What time does she get home?

   b. If Mac wants dinner to be ready at 2:00 and it takes 12 hours to bake, what time must he put it in the oven?

   c. Today is the first day of the week. Katorse celebrates her birthday in 17 days. What day of the week is her birthday?

   d. Today is the 2nd day of the 2nd month. What was the date 70 days ago?