8^{th} Grade Assignment – Week #1

A Word of Advice:

- Number Bases is certainly a wonderful and challenging topic. It can be quite challenging. Just remember to never give up!

Group Assignment

For Tuesday

- At the end of the lecture, I gave you two problems to think about. The idea was that Bob counts in octal (base-eight), and he counts the sheep and writes down the number (in octal). You then count the same sheep, and write down your number (in decimal, base-ten). As I said in the lecture, his number (octal) 30 is the same as our number (decimal) 24. The two problems I gave for you to contemplate are:
    - 125
    - 2156

  These are both octal numbers (Bob's way of counting the sheep). You task is to calculate the decimal (base-ten) numbers that are equivalent to the above two octal numbers.

  Perhaps you don't solve it, but thinking about, working on it, and making mistakes with it, will make the Wednesday lecture more fruitful.

For Thursday

- See how far you get with the problems on **Number Bases - Practice Sheet #1**. This requires you to know the following two things:
    - *Scientific Notation*.
      Example: 2,384,000,000 in scientific notation is $2.384 \cdot 10^{9}$
      Example: 0.0000451 in scientific notation is $4.51 \cdot 10^{-5}$
    - *Expanded Notation*.
      Example: $6472 \rightarrow 6 \cdot 10^{3} + 4 \cdot 10^{2} + 7 \cdot 10^{1} + 2 \cdot 10^{0}$ where 10^{0} is equal to 1
      (The strange fact that anything raised to the zero, is explained at some point later.)

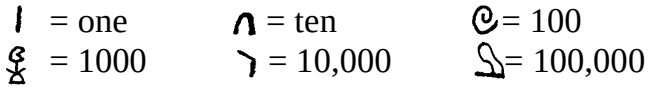
Individual Work:

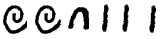
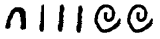
- No additional individual work this first week.
- Listen to the lectures and do your best to understand them! (Which, of course, you will do every week!)
- Make sure that your group meets on Tuesday and Thursday.
- You may wish to complete any of the above group work that didn't get finished in your group session.

Number Bases – Practice Sheet #1

The Egyptian Number System.

(A non-positional number system)



Example: 213 can be written in the Egyptian system as  or as  or as  . The position of the symbols does not matter.

1) Fill in the table.

	Egyptian	Decimal	Scientific
a)			
b)		2405	
c)			$3.041 \cdot 10^5$
d)		20050	

2) Convert each number from *standard decimal form* to *expanded notation*.

a) 564

b) 2369

c) 2400

d) 56,000,000

e) 300,400

3) Convert each number from *expanded notation* to *standard decimal form*.

a) $7 \cdot 10^2 + 9 \cdot 10^1 + 8 \cdot 10^0$

b) $7 \cdot 10^5 + 3 \cdot 10^4 + 2 \cdot 10^3 + 1 \cdot 10^2 + 4 \cdot 10^1 + 5 \cdot 10^0$

c) $4 \cdot 10^8 + 6 \cdot 10^6 + 7 \cdot 10^4 + 9 \cdot 10^2 + 8 \cdot 10^0$

d) $4 \cdot 10^7 + 6 \cdot 10^6$

4) Convert to *scientific notation*.

a) 320,000,000

b) 6078.89

c) 700,000,000,000

d) 4 trillion

e) 20^{10}

5) Convert to *standard decimal form*.

a) $5.8 \cdot 10^6$

b) $2.4038 \cdot 10^3$

c) $1.83 \cdot 10^{14}$

d) $4 \cdot 10^1$

e) $4.39853 \cdot 10^9$

f) $7.43 \cdot 10^0$