Question:
What is a more concise way to write REALLY large and REALLY small numbers?

Before we answer that, what are some examples of times when we need really big or really small numbers?

United States National Debt
Since the U.S. National Debt is almost $16,000,000,000,000 we can write it more **concisely** using **scientific notation**.

A number expressed in scientific notation will look like this:

\[ a \times 10^n \]

\( a \) must be a number between 1 and 10.

\( n \) is any integer.

If \( n \) is **positive**, the number is greater than 1 and is a "BIG " number.

If \( n \) is **negative**, the number is between 0 and 1 and is a "SMALL" number.
How would we express the U.S. National Debt using scientific notation?
$16,000,000,000,000$
First, place the decimal at the end of the number (if there's not one there).
$16,000,000,000,000.$
Then count how many places you have to move the decimal until the number to the left of the decimal is between 1 and 10.
$1.60000000000000 <--$ 13 places
Drop any zeros at the end of the number, and the remaining value is your $a$ value. The number of places the decimal moved is $n$.
$1.6 \times 10^{13}$
For small numbers, the process is the same except that the decimal gets moved to the right!

Ex. 0.000000245
Move the decimal until you get a number between 1 and 10 (ignoring the zeroes).
Count how many decimal places you move and that will be your $n$ value.

$a$ is 2.45 and $n$ is -7 (since we moved in the opposite direction)

$$2.45 \times 10^{-7}$$
Your homework for tonight is:

-In your workbook:

Page 199 - #5-17
Page 201 - #5-7
Page 203 - #23-27 Odd
Page 207 - #29-35 Odd