Super-Scientific Notation

Scientific notation:
   $1200 = 1.2(10^3)$
   $400{,}000 = 4.0(10^5)$

Super-scientific notation:
1200 and 400,000 can be written *as powers of ten*. We will call this *super-scientific* notation.

1. Explain why 1200 must be a power of ten with the exponent between 3 and 4.

2. $400{,}000$ must be a power of ten with the exponent between what whole numbers?

3. Find the power of ten that approximately equals the following numbers. Your answer should be accurate to the nearest thousandth.
   a. 1200
   b. 400,000

Looking for Patterns

4. Write the following numbers in super-scientific notation (with the exponents rounded to the nearest thousandth). Arrange the results in a table. Look for patterns as you work. Share the calculations with other students, and enter the answers in the table on the next page.
   a. The whole numbers from 1 to 9
   b. The multiples of 10 from 10 to 90
   c. The multiples of 100 from 100 to 900

5. What is the relationship between the exponents for 2, 20, and 200? Explain.

6. What is the relationship between the exponents for 3 and 9? Explain.

7. What is the relationship between the exponents for 20, 30, and 600? Explain.

8. What is the relationship between the exponents for 2 and 8? Explain.

9. Find other relationships between exponents, and explain them.

Calculating Without a Calculator!

10. Without a calculator, write the following in super-scientific notation. (Hint: use your table.)
   a. 9000
   b. .8
   c. .02
   d. 500,000
   e. 72
   f. 2/3
   g. 3/2
   h. 2700

Reflecting

11. Here is a calculation that uses scientific notation:
$1200 \cdot 400{,}000 = 1.2(10^3) \cdot 4.0(10^5) = 4.8(10^8)$
   What is the equivalent calculation using super-scientific notation?

12. Explain the following statement:
   Multiplying two numbers written in scientific notation involves a multiplication and an addition.

13. What is the corresponding statement for multiplying two numbers written in super-scientific notation? Explain.

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Number	SSN	Exponent in SSN	Number	SSN	Exponent in SSN	Number	SSN	Exponent in SSN
1			10	10^1	1	100		
2	$10^{0.301}$	0.301	20			200		
3			30			300		
4			40			400		
5			50			500		
6			60			600		
7			70			700		
8			80			800		
9			90			900		