Name: _____

[1-9A] Scientific Notation and Standard Form (Decimal Notation) Notes

> By using exponents, we can reformat numbers. For very large or very small numbers, it is sometimes simpler to use "scientific notation" (so called, because scientists often deal with very large and very small numbers).
> The format for writing a number in scientific notation is fairly simple: (first digit of the number) followed by (the decimal point) and then (all the rest of the digits of the number), times (10 to an appropriate power). The conversion is fairly simple.
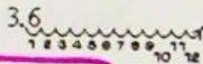
- **Write 124 in scientific notation.**
  This is not a very large number, but it will work nicely for an example. To convert this to scientific notation, I first write "1.24". This is not the same number, but $(1.24)(100) = 124$ is, and $100 = 10^2$. Then, in scientific notation, 124 is written as 1.24×10^2.

> Actually, converting between "regular" notation and scientific notation is even simpler than I just showed; because all you really need to do is count decimal places.

- **Write in decimal notation:** 3.6×10^{12}
  Since the exponent on 10 is positive, I know they are looking for a LARGE number, so I'll need to move the decimal point to the right, in order to make the number LARGER. Since the exponent on 10 is "12", I'll need to move the decimal point twelve places over. First, I'll move the decimal point twelve places over. I make little loops when I count off the places, to keep track:

  Then I fill in the loops with zeroes:
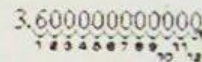
  In other words, the number is **3,600,000,000,000** or 3.6 trillion

- **Convert 93,000,000 to scientific notation.**
  This is a large number, so the exponent on 10 will be positive. The first "interesting" digit in this number is the leading 9, so that's where the decimal point will need to go. To get from where it is to right after the 9, the decimal point will need to move seven places to the left. Then the power on 10 will be a positive 7, and the answer is 9.3×10^7

Scientific Notation and Standard Form (Decimal Notation) Practice

Write in standard form.

1) 4.0×10^3 **4000**

2) 4.5×10^4 **45,000**

3) 6.5×10^5 **650000**

4) 7.6×10^2 **760**

5) 8×10^3 **8,000**

6) 6.32×10^7 **63,200000**

Write each number in scientific notation.

7) 465,000,000 4.65×10^8

8) 98,000,000,000 9.8×10^{10}

9) 373,000 3.73×10^5

10) 697,000,000,000 6.97×10^{11}

11) 54,000,000 5.4×10^7

12) 24,340,000 2.434×10^7

Use your calculator to evaluate the following. Write the answer in scientific notation and standard form.

	Scientific notation (3 significant digits)	Standard form
13) 7^{12}	1.38×10^{10}	13,800,000,000
14) 12^{15}	1.54×10^{16}	15,400,000,000,000,000
15) 4^{24}	2.81×10^{14}	281,000,000,000,000
16) 18^9	1.98×10^{11}	198,000,000,000

Name: _____

Convert to standard form

Convert to scientific notation

4.546×10^7 = _____

63,750,000

_____

6.006×10^7 = _____

5,130,000

_____

4.51×10^7 = _____

177,000

_____

1×10^5 = _____

5,140

_____

9.1×10^7 = _____

460,000,000

_____

6.08×10^8 = _____

227,200,000

_____

5.702×10^3 = _____

776,800,000

_____

8.8×10^3 = _____

82,100

_____

5.072×10^7 = _____

382,000,000

_____

9.05×10^4 = _____

1,790,000

_____