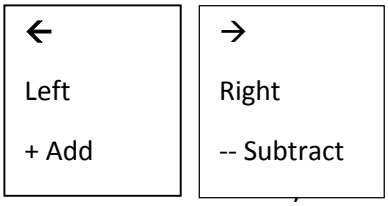
Scientific Notation—Adding and Subtracting

*You already have notes—from 10-15-15—with examples a.—f. on the back—LOOK at them!

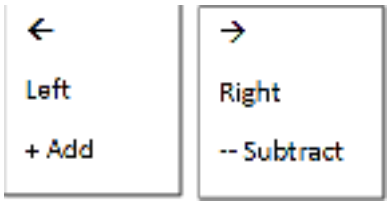
To add or subtract, remember:



- Both numbers have to be in scientific notation ("the
- The EXPONENTS must match (same number)
  - Add or subtract from one of them (doesn't matter
  - If you change the exponent you have to change the decimal!
  - Memorize the directions—left means add, right means subtract
- You add or subtract the regular #'s (can be whole or decimal)
- Write your new # with the same power (base of 10 with same 'matching' exponent)
- "change the decimal" if needed
  - Basics: between 1 and 10
  - If you move the decimal to fit the basics: YOU NEED TO + OR – TO THE EXPONENT!

Keep It Simple Steps:

1. Make exponents match
2. Move the decimal
3. Add or subtract the actual #
4. Write the answer—IN scientific notation

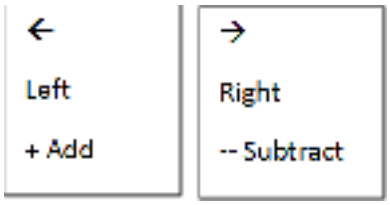


$(6.89 \times 10^4) + (9.24 \times 10^5)$	$(6.89 \times 10^4) + (9.24 \times 10^5)$
1. Make exponents match Add 1 to the 4	1. Make the exponents match Subtract 1 from 5
2. Move the decimal 1 to the left on 6.89 (6.89×10^4) becomes $.689 \times 10^5$	2. Move the decimal 1 to the right on 9.24 (9.24×10^5) becomes 92.4×10^4
3. Add the #'s (.689 + 9.24) = 9.929	3. Add the #'s (6.89 + 92.4) = 99.29
4. Write the answer 9.929×10^5	4. Write the answer 99.29×10^4 *Make into Scientific Notation! --move decimal ONE to the left—[between 1 and 10!] --moving the left means ADD—so add 1 to the exponent Answer: 9.929×10^5

EXAMPLE OF SUBTRACTING—WITH NEGATIVES

Keep It Simple Steps:

5. Make exponents match
6. Move the decimal
7. Add or subtract the actual #
8. Write the answer—IN scientific notation



$(9 \times 10^{-5}) - (6 \times 10^{-7})$	$(9 \times 10^{-5}) - (6 \times 10^{-7})$
1. Make exponents match Subtract 2 from -5 (both exponents will = -7) -5 – 2 = -7 [integer rules: signs same, +, keep sign]	1. Make the exponents match Add 2 to -7 (both exponents will = -5) 2+ -7 = -5 [integer rules: signs different, - , sign of larger]
2. Move the decimal SUBTRACT 2, then we MOVE RIGHT 2 9 becomes 900 (9×10^{-5}) becomes (900×10^{-7})	2. Move the decimal ADD 2, then we MOVE LEFT 2 6 becomes .06 (6×10^{-7}) becomes ($.06 \times 10^{-5}$)
3. Subtract the #'s (900 – 6) = 894	3. Subtract the #'s (9 - .06) = 8.94
4. Write the answer 894×10^{-7} *Make it scientific notation! 894 becomes 8.94 (decimal 2 to LEFT) *LEFT –ADD—so ADD 2 to exponent -7 + 2 = -5 Final Answer: 8.94×10^{-5}	4. Write the answer 8.94×10^{-5} *Already in Scientific Notation ☺
Look, our answers match!	