

Name: _____ Date: _____ Per. _____

U8 CWK #3

More Operations in Scientific Notation

1. Will the method for multiplying and dividing numbers in scientific notation work for adding and subtracting numbers in scientific notation?

2. Rewrite 5,000,000 and 2,000,000 in scientific notation.

$5,000,000 = 5 \times 10^6$

$2,000,000 = 2 \times 10^6$

3. Test the method you learned above to see if it works for subtraction. First subtract 2,000,000 from 5,000,000. Then change the numbers to scientific notation and subtract them using the method above to see if you get the same answer.

$5,000,000 - 2,000,000 = 3,000,000$
 $(5 \times 10^6) - (2 \times 10^6) = 3 \times 10^6$
 = what did we do in scientific number?

4. Write in your own words how to add or subtract numbers in scientific notation that have the same exponent or order of magnitude.

$(5-2)$ Same magnitude = 3×10^6
 stays same (10^6)

5. Find each sum or difference. Write your answer in scientific notation.

<p>a. $(3.45 \times 10^3) + (6.11 \times 10^3)$</p> <p>Add stay same $(3.45 + 6.11) 10^3$ 9.56×10^3</p>	<p>b. $(8.96 \times 10^7) - (3.41 \times 10^7)$</p> <p>$5.55 \times 10^7$</p>	<p>c. $(6.43 \times 10^0) + (4.39 \times 10^0)$</p> <p>$10.82 10^0$ 1.082×10^1</p>
<p>d. $(1.23 \times 10^{-4}) + (8.04 \times 10^{-4})$</p> <p>$9.27 \times 10^{-4}$</p>	<p>e. $(4.5 \times 10^{11}) - (3.2 \times 10^{11})$</p> <p>$1.3 \times 10^{11}$</p>	<p>f. $(6.1 \times 10^{-8}) - (3.2 \times 10^{-8})$</p> <p>$2.9 \times 10^{-8}$</p>

6. You might be wondering what to do if the numbers do not have the same order of magnitude. Write down your ideas of how you might be able to add or subtract these numbers. Be ready to share your ideas with the class.

Try to add or subtract numbers in scientific notation:

- *1. Make sure they have the same exponent or order of magnitude. If they don't, move the decimal so they do.
- *2. Add or subtract the significant figures and keep the order of magnitude the same.
- *3. Write your final answer in scientific notation.

$$(a \times 10^n) + (b \times 10^n) = (a+b) \times 10^n$$

$$(a \times 10^n) - (b \times 10^n) = (a-b) \times 10^n$$

Algebraically

Most important step

Try it out with the problems given below.
7. Find each sum or difference. Write your answer in scientific notation.

a. $(4.12 \times 10^5) + (3.94 \times 10^4)$ $(4.12 \times 10^5) + (0.394 \times 10^5)$ 41.5944 × 10 ⁵ 4.15944 × 10 ⁶	b. $(4.23 \times 10^3) - (9.56 \times 10^2)$ $(4.23 \times 10^3) - (0.956 \times 10^3)$ 3.274 × 10 ³	c. $(3.4 \times 10^{-3}) + (4.57 \times 10^{-2})$ $(0.34 \times 10^{-2}) + (4.57 \times 10^{-2})$ 4.91 × 10 ⁻²
d. $(3.67 \times 10^3) - (1.6 \times 10^{-1})$ $(3.67 \times 10^3) - (0.0016 \times 10^3)$ 3.66984 × 10 ³	e. $(8.41 \times 10^{-5}) - (7.9 \times 10^{-6})$ $(8.41 \times 10^{-5}) - (0.79 \times 10^{-5})$ 7.62 × 10 ⁻⁵	f. $(6.91 \times 10^{-2}) + (2.4 \times 10^2)$ $(0.00691 \times 10^3) + (2.4 \times 10^3)$ 2.400691 × 10 ³

Problem Solving (use scientific notation where possible)

8. The earth is 9.3×10^7 miles from the sun. Pluto is 3.67×10^9 miles from the sun. How far is it to Pluto from Earth? (Hint: Draw and label a picture.)

$$(3.67 \times 10^9) - (9.3 \times 10^7) = 35.77 \times 10^8$$

$$(367 \times 10^8) - (93 \times 10^8) = 3577 \times 10^8 \text{ mi}$$

9. Pretend a new planet has been found in the far reaches of the universe.

- a. You know the earth is 9.3×10^7 miles from the sun and the planet you are interested in is 7.3×10^{12} miles beyond the sun in the opposite direction of the earth. What is the distance to the planet from Earth? (Hint: Draw and label a picture)

$$(9.3 \times 10^7) + (7.3 \times 10^{12})$$

$$(0.000093 \times 10^{12}) + (7.3 \times 10^{12})$$

$$7.3000093 \times 10^{12} \text{ mi}$$

- b. Using the distance you found above and the fact that light travels at 5.88×10^8 miles in one light year. Determine how many light years it will take for light to travel to this planet from Earth.

$$7.3000093 \times 10^{12} \text{ mi}$$

$$5.88 \times 10^8$$

$$1.24 \times 10^6$$

$$1.24 \text{ light years}$$