Warm Up

Simplify:

$$7.23 \times 10^{12} + 6.8 \times 10^{10+2}$$

we need to have "like terms" to be able to add

Make both exponents = 12

$7.23 \times 10^{12} + 0.068 \times 10^{12}$

Add

7.298×10^{12}

Check that this is in proper SN form

What if:

$$2.81 \times 10^{-3} + 2 \times 10^{-1}$$

change to 2.81×10^{-1}

$0.0281 \times 10^{-1} + 2 \times 10^{-1} =$

2.0281×10^{-1}

Kuta Software - In

Homework Questions?

Addition and Subtraction With Scientific Notation

Date_____ Period____

Simplify. Write each answer in scientific notation.

1) $3.1 \times 10^3 + 4.3 \times 10^3$

7.4×10^3

2) $3 \times 10^1 + 6.4 \times 10^2$

6.7×10^2

3) $2.4 \times 10^4 + 5.57 \times 10^3$

2.957×10^4

4) $5 \times 10^{-2} + 1.6 \times 10^{-3}$

5.16×10^{-2}

5) $2.5 \times 10^1 + 6.14 \times 10^4$

6.1425×10^4

6) $7 \times 10^{-1} + 6.4 \times 10^{-5}$

7.00064×10^{-1}

7) $5 \times 10^{-3} + 3.3 \times 10^{-6}$

5.0033×10^{-3}

8) $8 \times 10^{-1} + 6.9 \times 10^3$

6.9008×10^3

9) $1.39 \times 10^5 - 4 \times 10^2$

1.386×10^5

10) $2.74 \times 10^{-1} - 6.53 \times 10^{-4}$

2.73347×10^{-1}

11) $8.14 \times 10^5 - 7.8 \times 10^2$

8.1322×10^5

12) $6.36 \times 10^3 - 5.8 \times 10^{-1}$

6.35942×10^3

13) $5.1 \times 10^{-1} + 0.38 \times 10^4$

3.80051×10^3

14) $5.9 \times 10^{-2} - 0.078 \times 10^3$

-7.7941×10^1

$-0.07.7941 \times 10^{3-2}$

7.7941×10^1

When adding or subtracting using SN:

1. Create "like terms" - the exponents on the 10's should be the same. (Choose the greater value.)

2. Perform the operation.

3. Make sure your answer is in proper Scientific Notation form.

Operations with Scientific Notation

$1.2 \times 10^7 \cdot 3 \times 10^3$

$$\frac{6 \times 10^7}{3 \times 10^3}$$

What would happen if we replaced 10 with a variable?

$1.2a^7 \cdot 3a^3$

$3.6a^{10}$

"a" is our common base

$$\frac{6a^7}{3a^3} = 2a^4$$

$1.2 \times 10^7 \cdot 3 \times 10^3$

3.6×10^{10}

"10" is our common base

$$\frac{6 \times 10^7}{3 \times 10^3}$$

2×10^4

It is the exact same process that we are used to using with monomials!

Practice

$(2\times10^{5})(3\times10^{2}) = 6\cdot10^{7}$

$6\cdot10^{7}$

$(5\times10^{-2})(2.3\times10^{12})$

$5\cdot10^{-2}\cdot2.3\cdot10^{12} = 11.5\times10^{10+1} = 1.15\times10^{11}$

$(2.5\times10^{-3})(6\times10^{-15}) = 15\times10^{-18+1}$

1.5×10^{-17}

$\frac{4.8\times10^{-4}}{1.2\times10^{-7}} = \frac{4\times10^{7}}{10^{4}} = 4\times10^{3}$

$4\times10^{-4--7} = 4\times10^{3}$

$\frac{1.2\times10^{5}}{6\times10^{3}} = 0.2\times10^{2-1}$

2.0×10^{1}

Multiplication
When numbers in scientific notation are multiplied, only the number is multiplied. The exponents are added.

$$(2.00 \times 10^3)(4.00 \times 10^4) = (2.00)(4.00) \times 10^{3+4}$$
$$= 8.00 \times 10^7$$

Division
When numbers in scientific notation are divided, only the number is divided. The exponents are subtracted.

$$\frac{9.60 \times 10^7}{1.60 \times 10^4} = \frac{9.60}{1.60} \times 10^{7-4}$$
$$= 6.00 \times 10^3$$

1. $(4 \times 10^2)(2.2 \times 10^5)$

8.8×10^7

2. $\frac{9 \times 10^{-4}}{3 \times 10^0}$ $= 3 \times 10^{-4}$

3. $(6.02 \times 10^7)(2 \times 10^{-1})$

$12.04 \times 10^{6+1}$

1.204×10^7

4. $\frac{1.4 \times 10^4}{2 \times 10^8}$ $= 0.7 \times 10^{-4-1}$

$\frac{0.7}{10^4} = 0.7 \times 10^{-4}$ 7.0×10^{-5}

5. $(7 \times 10^{-3})(5 \times 10^{-10})$

$35 \times 10^{-13+1}$

3.5×10^{-12}

6. $\frac{3.5 \times 10^{-5}}{7 \times 10^{-2}}$ $= 0.5 \times 10^{-3-1}$

$\frac{10^{-5}}{10^{-2}} = 10^{-5--2} = 10^{-3}$ 5×10^{-4}

7. $(4.1 \times 10^3)(5 \times 10^5)$

8. $\frac{6.6 \times 10^7}{3 \times 10^{-6}}$

9. $(2.5 \times 10^4)(4 \times 10^{-7})$

10. $\frac{4.6 \times 10^{-4}}{2.3 \times 10^0}$

Operations with Scientific Notation

These should all be solved without using a calculator. Make sure your answers are in proper scientific notation.

1. $(2.5 \times 10^{6})(3 \times 10^{3}) =$

2. $(3 \times 10^{-5})(3 \times 10^{-10}) =$

3. $(4 \times 10^{1})(2 \times 10^{11}) =$

4. $(6 \times 10^{5})(4 \times 10^{3}) =$

5. $(5 \times 10^{-15})(7 \times 10^{6}) =$

6. $(2 \times 10^{-4})(7 \times 10^{-8}) =$

7. $(7 \times 10^{6})(3 \times 10^{-7}) =$

8. $(4 \times 10^{-10})(3 \times 10^{13}) =$

9. $\dfrac{2.6 \times 10^{-3}}{1.3 \times 10^{9}} =$

10. $\dfrac{5 \times 10^{8}}{2 \times 10^{3}} =$

11. $\dfrac{1.2 \times 10^{7}}{4 \times 10^{5}} =$

12. $\dfrac{2.3 \times 10^{-3}}{4.6 \times 10^{9}} =$

13. $\dfrac{7 \times 10^{-5}}{3.5 \times 10^{-9}} =$

14. $\dfrac{9 \times 10^{-3}}{3 \times 10^{-3}} =$

15. $\dfrac{2.8 \times 10^{0}}{4 \times 10^{-7}} =$

16. $\dfrac{2 \times 10^{-2}}{8 \times 10^{-11}} =$

Homework

Finish classwork