Warm Up

Simplify:

$$25x^2y^{-5} \cdot 15^{-1}x^7y^4$$

Put everything in its place

$$\frac{\overset{5}{\cancel{25}}\,x^2\,x^7\,y^4}{y^5\,\underset{3}{\cancel{15}}}$$

$$\frac{5x^9}{3y}$$

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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

$3 \times 10^1 \rightarrow .3 \times 10^2 + 6.4 \times 10^2$
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}

1.6×10^{-3}

$5 \times 10^{-2} + .16 \times 10^{-2}$
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

$\rightarrow .0078 \times 10^5$

$8.14 \times 10^5 - 0.0078 \times 10^5$
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

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

$0.000051 \times 10^4 + 0.38 \times 10^4$

0.380051×10^4

3.80051×10^3

Operations with Scientific Notation

$$1.2 \times 10^7 \cdot 3 \times 10^3 \qquad\qquad \frac{6 \times 10^7}{3 \times 10^3}$$

What would happen if we replaced 10 with a variable?

$$1.2a^7 \cdot 3a^3$$
$$3.6a^{10}$$

"a" is our common base

$$\frac{\overset{2}{6}a^7}{\underset{1}{3}a^3}$$
$$2a^4$$

$$1.2 \times 10^7 \cdot 3 \times 10^3$$
$$3.6 \times 10^{10}$$

"10" is our common base

$$\frac{\overset{2}{6} \times 10^7}{\underset{1}{3} \times 10^3}$$
$$2 \times 10^4$$

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

$$2 \times 10^5 \cdot 4 \times 10^{10}$$
$$8 \times 10^{15}$$

$$\frac{7 \times 10^4}{2 \times 10^3}$$
$$3.5 \times 10^1$$

Practice

$$\left(2 \times 10^5\right)\left(3 \times 10^2\right) = 6 \times 10^7$$

$$\left(5 \times 10^{-2}\right)\left(2.3 \times 10^{12}\right) = 11.5 \times 10^{10}$$

$$10 + 1.5 = 11.5 \qquad\qquad 1.15 \times 10^{11}$$

$$\left(2.5 \times 10^{-3}\right)\left(6 \times 10^{-15}\right) = 15 \times 10^{-18}$$

$$12 + 3 = 15 \qquad\qquad 1.5 \times 10^{-17}$$

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

$$\overset{1}{}\ \frac{4a^{-4}}{a^{-7}} \rightarrow \frac{4a^7}{a^4} = 4a^3$$

$$\frac{1.2 \times 10^5}{6 \times 10^3} = 0.2 \times 10^2 = 2 \times 10^1$$

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