Lesson 1.11 – Operations Using Numbers in Scientific Form (Adding/Subtracting)

Recall that a number in scientific notation is expressed in the form of $a \times 10^b$, where a is any real number and $1 \le a < 10$, and b is an integer. In order to add/ subtract numbers expressed in scientific notation, we need to review what occurs when we add/subtract variables and how we handle their coefficients. Let's review…

$5x + 3x$	$7a + 4b - 3a + 8b$	$12y - 3y + 2y^2$

Adding and subtracting numbers expressed in scientific notation is similar to what we see in our work above. Let's move onto the lesson and see how this is done.

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Adding/Subtracting Numbers in Scientific Notation

$$\left(6.5 \times 10^7\right) + \left(8.2 \times 10^7\right)$$

Two numbers expressed in scientific notation that will be added together.

To help us understand how to add or subtract numbers in scientific notation we will compare the two examples below.

Ex.1 $\left(6.5 \times 10^7\right) + \left(8.2 \times 10^7\right)$	Ex. 2 $6.5n + 8.2n$

The key to adding or subtracting numbers that are in $a \times 10^b$ form is the magnitudes of the numbers. If the magnitude of both numbers is the same, we can add the 'a' values. If the magnitude of the numbers is different, then we will need to make some adjustments before we proceed. Let's complete some notes to make it a little more concrete for us to understand.

Class Notes – Simplify the following. Express your answers using proper scientific notation.

LP#1 $\left(1.3 \times 10^7\right) + \left(5.36 \times 10^7\right)$	$\left(6.23 \times 10^{12}\right) + \left(2.08 \times 10^{12}\right)$
LP#2 $\left(8.54 \times 10^{-15}\right) - \left(6.97 \times 10^{-15}\right)$	$\left(7.92 \times 10^{-21}\right) + \left(1.56 \times 10^{-21}\right)$
LP#3 $\left(7.21 \times 10^{32}\right) + \left(4.98 \times 10^{32}\right)$	$\left(3.7 \times 10^{-16}\right) + \left(9.8 \times 10^{-16}\right)$
LP#4 $\left(7.42 \times 10^{-53}\right) - \left(6.89 \times 10^{-53}\right)$	$\left(4.5 \times 10^{17}\right) - \left(3.781 \times 10^{17}\right)$
LP#5 $\left(1.324 \times 10^{16}\right) + \left(6.81 \times 10^{17}\right)$	$\left(6.51 \times 10^{21}\right) + \left(2.12 \times 10^{20}\right)$
LP#6 $\left(3.98 \times 10^{25}\right) - \left(8.21 \times 10^{23}\right)$	$\left(9.876 \times 10^{-17}\right) - \left(7.546 \times 10^{-19}\right)$

Review – Simplify the following. Express your answers using proper scientific notation.

R#1 $\left(3.35\times10^{9}\right)+\left(4.21\times10^{9}\right)$	$\left(8.23\times10^{14}\right)-\left(1.86\times10^{13}\right)$
R#2 $\left(5.21\times10^{-18}\right)-\left(4.69\times10^{-18}\right)$	$\left(6.81\times10^{-23}\right)+\left(2.96\times10^{-21}\right)$
R#3 $\left(1.99\times10^{42}\right)+\left(9.91\times10^{40}\right)$	$\left(8.9\times10^{-18}\right)+\left(7.8\times10^{-18}\right)$

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