Dividing scientific notation

Dividing one number by another in scientific notation is really similar to multiplying two numbers in scientific notation, because we're basically following the same steps.

1. Divide their decimal numbers.
2. Divide their powers of 10. By the rules of exponents, we subtract the exponents when we do this.
3. Express the results together in proper scientific notation.

Let's do an example.

Example

Find the quotient.

$$(3.4 \times 10^{-6}) \div (2.14 \times 10^{13})$$

Let's follow the steps we outlined above. First, we'll divide the decimal numbers.

$$3.4 \div 2.14 = 1.588785$$

Now we'll divide the powers of 10, subtracting the exponents.

$$10^{-6} \div 10^{13} = 10^{-6-13} = 10^{-19}$$

Next, we'll write down the multiplication problem in which the numbers to be multiplied are the results of those two divisions.

$$1.588785 \times 10^{-19}$$

This is already in proper scientific notation, because there's just one nonzero digit to the left of the decimal point, so we can leave it as is. But if there were two or more digits to the left of the decimal point, or if we had a 0 in the ones (units) place, then we'd have to express it in proper scientific notation.