**Multiplying Exponents**

What happens when we multiply exponents? For example what is the result of $2^{5}×2^{7}$? Find the answer and put it back into exponential form.

Another way of thinking of this is in an equation $2^{5}×2^{7}=2^{x}$, what value of x makes this statement true?

Can you find a rule for any combination of powers of 2? Can that rule work for any base number? If so finish the equation $x^{a}×x^{b}=x^{?}$

**Dividing Exponents**

What happens when we divide exponents? For example what is the result of $\frac{2^{9}}{2^{2}}$? Find the answer and put it back into exponential form.

Another way of thinking of this is in an equation $\frac{2^{9}}{2^{2}}=2^{x}$, what value of x makes this statement true?

Can you find a rule for any combination of powers of 2? Can that rule work for any base number? If so finish the equation $\frac{x^{a}}{x^{b}}=x^{?}$

**Exponentiating Exponents**

What happens when we exponentiate exponents? For example what is the result of $(2^{5})^{2} $? Find the answer and put it back into exponential form.

Another way of thinking of this is in an equation $(2^{5})^{2} =2^{x}$, what value of x makes this statement true?

Can you find a rule for any combination of powers of 2? Can that rule work for any base number? If so finish the equation $(x^{a})^{b}=x^{?}$

**Challenge: What is x0?**

What is the value of $\frac{5^{7}}{5^{7}}$? of $\frac{8^{3}}{8^{3}}$? of $\frac{c^{12}}{c^{12}}$? What is the value of any number divided by itself?

If you apply the common-base rule dealing with exponents and division, $\frac{5^{7}}{5^{7}}$ should equal 5 raised to what power? and $\frac{c^{12}}{c^{12}}$ should equal c raised to what power? It therefore makes sense to define $c^{0}$ to be what?