**Math 9 Exponent Laws (part 2) Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Day \_\_\_ Period \_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_**

**Warm-up:**

When multiplying the same bases together you can just \_\_\_\_\_\_ the exponents.

When dividing the same bases you can just \_\_\_\_\_\_\_\_\_\_\_\_\_ the exponents.

What is $2^{6}÷2^{2}?$ What is $\left(-5\right)^{3}\left(-5\right)^{4}(-5)^{-2}$ ?

**Activity 1:**

In your group, discuss what $\left(4^{2}\right)^{3}$ means.

It means\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Try writing $\left(4^{2}\right)^{3}$ in expanded form.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Now count up the number of 4s you have and rewrite $\left(4^{2}\right)^{3}$ in exponential form. You should only have ONE exponent this time. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Activity 2:** Fill in the table below. The first row has been done for you.

|  |  |  |  |
| --- | --- | --- | --- |
| A power raised to an exponent | Partly expanded | Fully expanded | Exponential form |
| $$(2^{5})^{3}$$ | $$2^{5}×2^{5}×2^{5}$$ |  $2×2×2×2×2×2×2×2×2×2×2×2×2×2×2$ | $$2^{15}$$ |
| $$(3^{2})^{4}$$ |  |  |  |
| $$(-5^{5})^{2}$$ |  |  |  |

Look at your table. Is there a faster way to go from the first column to the last column? Write it down.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Activity 3: Raising a quotient to an exponent. Raising a product to an exponent.**

Write $\left(\frac{3}{4}\right)^{2}$ in simplified exponential form. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write $\left(\left(\frac{2}{5}\right)^{2}\right)^{3}$ in simplified exponential form. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write $\left[2x\right]^{4}$ in simplified exponential form. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write $\left(\frac{1}{3}\right)\left(\frac{1}{3}\right)\left(\frac{1}{3}\right)\left(\frac{1}{3}\right)\left(\frac{1}{3}\right)$ as a quotient of two powers. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write $\left(9×4\right)\left(9×4\right)$ as a product of two powers. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Exponent Law 4**

**Exponent Law 5**

**Exponent Law 6**

**Activity 4**- Check your understanding Based on your understanding of the 6 Laws…

Based on your understanding of the 6 Laws…Which of the following can/cannot be done. Circle either can or cannot.

1. $a^{2}+a^{3}=a^{2+3}=a^{5}$ can/ cannot
2. $a^{2}×ab^{4}=(ab)^{2+4}$ can/ cannot
3. $ab^{5}×(ab)^{4}=a^{5}b^{9}$ can/cannot
4. $3^{2}×3^{4}=9^{6}$ can/ cannot
5. $(2^{3})^{2}=(2^{2})^{3}$ can/ cannot
6. $\left(a^{3}\right)^{4}=a^{3+4}$ can/cannot