**Exponent Laws** Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Math 9** Day \_\_\_\_ Period \_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Fill in the table.**

|  |  |  |
| --- | --- | --- |
|  | **Expanded form** | **Exponential form** |
| $$3^{2}×3^{2}$$ |  |  |
| $$2^{3}×2^{2}×2$$ |  |  |
| $$(-4)^{4}(-4)^{3}(-4)^{2}$$ |  |  |
| $$\frac{3^{3}}{3^{2}}$$ |  |  |
| $$\frac{4^{5}}{4^{3}}$$ |  |  |
| $$\frac{(-2)^{8}}{(-2)^{3}}$$ |  |  |

Karen’s explanation on how to solve $2^{9}×2^{7}$ Karen’s explanation on how to solve $\frac{2^{12}}{2^{4}}$



**EXPONENT LAW 1** xmxn = xm+n

**EXPONENT LAW 2** xm/xn = xm-n

Putting exponent laws 1 and 2 together:

$\frac{\left(4\right)^{3}(4)^{6}}{\left(4\right)^{2}(4)^{1}}$ $3^{5}×3^{4}÷3^{2}$

**The ONE and ZERO exponents:**

What does $2^{1}$ mean?

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

The table shows decreasing powers of 10.

|  |  |  |
| --- | --- | --- |
| Number in words | Standard form | Exponential form (power) |
| One million | 1 000 000  | $$10^{6}$$ |
| One hundred thousand | 100 000  | $$10^{5}$$ |
| Ten thousand | 10 000  | $$10^{4}$$ |
| One thousand | 1 000  | $$10^{3}$$ |
| One hundred | 100 | $$10^{2}$$ |
| Ten | 10 | $$10^{1}$$ |
| **One** | **1** | $$10^{0}$$ |

Use your patterning skills to complete the patterns below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Standard form | Exponential form |  | Standard form | Exponential form |
| 16 |  |  |  | $$3^{4}$$ |
| 8 |  |  |  | $$3^{3}$$ |
| 4 |  |  |  | $$3^{2}$$ |
| 2 |  |  |  | $$3^{1}$$ |
| 1 |  |  |  | $$3^{0}$$ |

Write in expanded form:

$\frac{3^{4}}{3^{4}}$=

**EXPONENT LAW 3** (xm)n = xmn

**In-class practice:**

**Separate piece of paper. Write out question and show work below question.**

$ a) (-2+4)^{0}$$b) -3^{0}$ **c)** $(-3)^{0}$

$ d) (-10)÷5^{0}$ **e)** $(-10÷5)^{0}$ **f)** $(4^{0})^{2}$

$g) \frac{8a^{4}}{4a^{2}}$ **h)** $3m^{5}×4m^{2}$ **i)** $\frac{5k^{6}×4k^{3}}{2k^{4}}$

$j) \frac{-36r^{7}}{24r^{5}}$ **k)** $5y^{3}×2y^{4}×3y^{7}$ **l)** $\frac{\left(-2\right)^{2}(-2)^{8}}{(-2)^{5}}$

$m) (11^{3}+5^{3})^{0}+(4^{2}×4^{1})$ **n)** $-2g^{6}×(-2g^{3})×4g^{5}$

**o)** $-7^{0}-\frac{3^{5}}{3^{4}} p) 6^{0}-4^{0}-\frac{2^{3}}{2^{3}}$

 **Homework: Page 106 # 5 to 11**