Exponent Operations Worksheet #1 **Name**_____**Per**_____

Multiplication

Part 1: Expand each expression then evaluate

1.) 2^8 = _____ _____ _____ _____ _____ _____ _____ _____ = _____

2.) 5^3=

3.) x^5 =

4.) 10^3 =

5.) $8^1 \cdot 8^4$ =

6.) $7^2 \cdot 7^3$ =

7.) $x^5 \cdot x^4$ =

8.) If two expressions have the same **factor** or **base**, what happens to the exponents when the expressions are **multiplied**?

_____

_____

Example: $(7x^2)(2x^3)$

Part 2: Simplify each expression.

9.) $2^3 \cdot 2^4$

10.) $8^1 \cdot 8^3$

11.) $t^4 \cdot t^4$

12.) $x^5 \cdot x^9$

13.) $3^4 \cdot x^3 \cdot x^5$

Part 3: Find the product of the expressions.

14.) $(6x^2)(4x^2)$

15.) $(3x^3y^2)(-6y^5)$

16.) $(5p^3)(-m^8p^2)$

17.) $(10g^3h^8v^6)(11gh^8)$

18.) $(4f^9h^3)(-5f^6)(-3h^2)$

19.) $(-2^2x^3y^4)((-3)^2x^4y^4)$

20.) *Challenge: $(3x^ay^bz^c)(-y^fz^g)$

Exponent Operations Worksheet #2 **Name**_____**Per**_____
Power to a Power
Part 1: Expand each expression and write the product.

1.) $(2^3)^4$ = _____ _____ _____ _____ = _____

2.) $(p^2)^5$ =

3.) $(x^m)^2$ =

4.) $(2^3 x)^2$ =

5.) What is the fast way to simplify when you raise an exponent to another power (or what can you do instead of expanding)?

_____

_____

Part 2: Find the product. <u>Expand</u> if it helps you.

6.) $(2x)^2$

7.) $(10^2)^3$

8.) $(-3^2 x^6)^5$

9.) $(7j^2)^3$

10.) $(8n^2 p)^3$

11.) $2(3a^2)^3$

12.) $(xy)^2 (x^2 y^2)^2$

13.) $\left(\frac{8x^2}{2x^2}\right)^2$

14.) $\left(\frac{3x^2}{2y^2}\right)^5$

15.) $\left(\frac{3x}{4x^2}\right)^2$

Exponents Operations Worksheet #3 **Name** _____ **Per**_____
Division

Part 1: Expand each expression to find the <u>quotient</u>.

1.) $\frac{2^4}{2^3}$ = _____ = _____

2.) $\frac{3^2 5^5}{3 \cdot 5^2}$ = _____ = _____

3.) $\frac{x^8}{x^3}$ =

4.) $\frac{2^3 x^3 y^4}{2 \cdot x y^2 z}$ =

5.) Explain why you can **subtract** exponents when you are dividing two things with the same base.

_____

_____

Part 2: Simplify to find the <u>quotients</u>.

6.) $\frac{a^8}{a^3}$

7.) $\frac{7^{11}}{7^8}$

8.) $\frac{7 \cdot b^5}{b^4}$

9.) $\frac{x^{10}}{x^4}$

10.) $\frac{12 \cdot g^8 \cdot h^4}{g^3 \cdot h^5}$

11.) $\frac{4 \cdot p^{11}}{8 \cdot p^6}$

12.) $\frac{c^9}{6c^4}$

13.) $\frac{2 \cdot x^3 y^8}{4 \cdot y^2}$

14.) $\frac{3x^{14} y^{11}}{18x^2}$

Part 3: Negative Exponents

15.) Anything to the zero power is _____. Show why this happens by solving this problem. $\frac{x^5}{x^5}$ = _____

Rewrite **without negative exponents**.

16.) $6 \cdot c^3 \cdot d^{-2}$

17.) $6x^4x^{-10}$

18.) $\left(2^0 \cdot x^{-3}\right)^4$

19.) $\frac{a^{12}b^{-3}}{a^5b^5}$

20.) $\left(\frac{5x^{13}y^5z^2}{3 \cdot 5^2}\right)^0$

21.) $(g^3 \cdot g^{-2})^4$

22.) $\left(\frac{4c^{-5}}{8d^0}\right)^3$

23.) $\left(\frac{x^{-8}}{y^{11}}\right)^{-2}$

24.) $\frac{(2x^3) \cdot (x^4)^2}{8x^{11}}$

Exponent	Result
4^4	
4^3	
4^2	
4^1	
4^0	
4^{-1}	
4^{-2}	

25.) What is the pattern on the **left side** of the table with the exponents?

26.) What is the pattern on the **right side** of the table with the results?