ADVANCED ALGEBRA/TRIG
UNIT 1 – EXPONENTS
1.5 – COMBINING EXPONENTS

NAME _____
PERIOD ____
ASSIGNMENT ____

Simplify:

*1. $(x^3)^2$

x^6

$(x^3)^2$ means $(x^3) \cdot (x^3)$
x^3 means $(x \cdot x \cdot x)$
so, $(x^3)^2$ means:
$(x \cdot x \cdot x) \cdot (x \cdot x \cdot x)$
or, when **raising an exponent** to an **exponent** **multiply** the **exponents**

*2. $(x^3y^{-2}z^{-1})^3 =$ $x^9y^{-6}z^{-3}$

3. $(a^4)^3$

4. $(x^2y^{-2}z^3)^5$

5. $(2^3)^2$

*6. $xy^2(x^2y^{-1})^3$

Order of operation: Nothing can be done inside the parentheses, Next is **exponents** -- You must apply the exponent of 3 to everything in parentheses before multiplying

$xy^2(x^6y^{-3})$

Multiply by **adding exponents** of **like variables**

x^7y^{-1}

*7. $(2^2)(2^{-3})(2^5)$

Multiply by **adding exponents**

$2^4 =$ 16

8. $x^5y(x^3y^4)^2$

9. $x^{-4}y^{-2}(x^3y^{-2}z^{-1})^3$

10. $(2^3)(2^{-3})(2^2)$

11. $(2^0)(2^{-4})(2^4)$

Simplify (Write the answer using only POSITIVE EXPONENTS):

*12. $\left(\frac{2}{3}\right)^2$

$\frac{4}{9}$

Square the numerator and denominator

*13. $\left(\frac{2}{3}\right)^{-2}$

$\left(\frac{3}{2}\right)^2$

$\frac{9}{4}$

Negative exponent outside parentheses means **invert** everything **inside** parentheses, then make the exponent positive

*14. $\frac{2^2}{2^6}$

$\frac{1}{2^4}$

$\frac{1}{16}$

Since each number has the same base (2), subtract the exponents, and put the result where largest exponent was

15. $\left(\frac{1}{2}\right)^3$

16. $\left(\frac{3}{2}\right)^2$

17. $\left(\frac{1}{2}\right)^{-2}$

18. $\left(\frac{3}{2}\right)^{-2}$

19. $\frac{2^3}{2^5}$

20. $\frac{2^7}{2^5}$

(OVER)

Simplify (Write the answer using only POSITIVE EXPONENTS):

*21. $\frac{2^2}{2^{-5}}$

$\frac{2^2 \cdot 2^5}{1}$

When a negative (**inverse**) exponent appears in a fraction, move it to the **other side** of the fraction bar (with the number attached to it) and make the exponent **positive**

$2^7 =$ (128)

*22. $\frac{a^7x^{-5}}{a^5x^4y^{-2}}$

$\frac{a^7y^2}{a^5x^4x^5}$

Move the numbers with negative exponents to the other side of the fraction bar to make the exponents positive, then simplify

$\frac{a^2y^2}{x^9}$

23. $\frac{2^2}{2^{-3}}$

24. $\frac{2^{-5}}{2^{-2}}$

25. $\left(\frac{x^2}{y^3}\right)^{-2}$

26. $\left(\frac{a^3x^{-1}}{a^5x^4y^{-2}}\right)^3$

27. $\left(\frac{a^2x^{-3}}{a^5x^4y^{-2}}\right)^{-2}$

1. x^6
2. $x^9y^{-6}z^{-3}$
3. a^{12}
4. $x^{10}y^{-10}z^{15}$
5. 64
6. x^7y^{-1}
7. 16
8. $x^{11}y^9$
9. $x^5y^{-8}z^{-3}$
10. 4
11. 1
12. $\frac{4}{9}$
13. $\frac{9}{4}$
14. $\frac{1}{16}$
15. $\frac{1}{8}$
16. $\frac{9}{4}$
17. 4
18. $\frac{4}{9}$
19. $\frac{1}{4}$
20. 4
21. 128
22. $\frac{a^2y^2}{x^9}$
23. 32
24. $\frac{1}{8}$
25. $\frac{y^6}{x^4}$
26. $\frac{y^6}{a^6x^{15}}$
27. $\frac{a^6x^{14}}{y^4}$