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Date _____
Algebra II

Exponents Rules

Express each of the following in simplest form

1. $(4x^3)(2x^5)$

$8x^8$

2. $(3x^4)(7x^8)$

$21x^{12}$

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

$-6x^7y^4$

4. $\frac{12x^8}{4x^3}$

$3x^5$

5. $\frac{24x^9}{3x^2}$

$8x^7$

6. $\frac{48x^8y^9}{4xy^8}$

$12x^7y$

7. x^0

1

8. $(4x)^0$

1

9. $(12x^3y^2)^0$

1

10. 7^2

$7 \cdot 7 = 49$

11. 2^4

$2 \cdot 2 \cdot 2 \cdot 2 = 16$

12. 5^3

$5 \cdot 5 \cdot 5 = 125$

multiply coefficients
add exponents

divide coefficients
subtract exponents

anything to the
power of 0 is 1

multiply the base by
itself the
exponent number
of times

- everything inside parenthesis gets the exponents
 - multiply when raising a power to a power

13. $(3x^4y)^2$
 $3^2 x^8 y^2$
 $9x^8y^2$

14. $(\frac{2x^2}{y^3})^3$
 $\frac{2^3 x^6}{y^9} = \frac{8x^6}{y^9}$

15. $(\frac{x^2y}{2mn^3})^4$
 $\frac{x^8 y^4}{2^4 m^4 n^{12}} = \frac{x^8 y^4}{16 m^4 n^{12}}$

16. $(x^4y^3)^{\frac{1}{2}}$
 $4 \cdot \frac{1}{2} = 2$
 $3 \cdot \frac{1}{2} = \frac{3}{2}$
 $x^2 y^{\frac{3}{2}}$

17. $(\frac{x^2}{y^6z^9})^{\frac{1}{3}}$
 $2 \cdot \frac{1}{3} = \frac{2}{3}$
 $6 \cdot \frac{1}{3} = 2$
 $9 \cdot \frac{1}{3} = 3$
 $\frac{x^{\frac{2}{3}}}{y^2 z^3}$

18. $(\frac{x^4y^8}{z^3})^{\frac{3}{2}}$
 $4 \cdot \frac{3}{2} = 6$
 $8 \cdot \frac{3}{2} = 12$
 $3 \cdot \frac{3}{2} = \frac{9}{2}$
 $\frac{x^6 y^{12}}{z^{\frac{9}{2}}}$

19. $\frac{5x^6 \cdot 4x^3}{2x^5}$ multiply first
 $\frac{20x^9}{2x^5}$ divide
 $10x^4$

20. $(2x^2y^3)^2(3xy)$ parenthesis first
 $(2^2 x^4 y^6)(3xy)$
 $(4x^4 y^6)(3xy)$

21. $\frac{(2x^3)^4}{4x^7}$ parenthesis first
 $\frac{2^4 x^{12}}{4x^7} = \frac{16x^{12}}{4x^7} = 4x^5$

22. $(\frac{4x^0y^3}{z})^3 (\frac{2z}{y})^2$ parenthesis first
 $(\frac{4^3 x^0 y^9}{z^3}) (\frac{2^2 z^2}{y^2})$

23. $(\frac{3x^3}{2z^2})^3 (\frac{x^2}{z})^4$ parenthesis first
 $(\frac{3^3 x^9}{2^3 z^6}) (\frac{x^8}{z^4})$
 $(\frac{27x^9}{8z^6}) (\frac{x^8}{z^4})$

24. $(\frac{x^2y}{z^8})^{\frac{1}{2}} (xz^{10})$ parenthesis first
 $(\frac{x^1 y^{\frac{1}{2}}}{z^8}) (xz^{10})$
 $\frac{x^2 y^{\frac{1}{2}} z^{10}}{z^8} = x^2 y^{\frac{1}{2}} z^2$

$(\frac{64y^9}{z^3}) (\frac{4z^2}{y^2}) = \frac{256y^9 z^2}{y^2 z^3} = \frac{256y^7 z^2}{z}$