

#1, Evaluate each expression *without* a calculator:

a. $3^{-2} = \frac{1}{9}$ b. $7^{-9} \cdot 7^9 = 1$ c. $\left(\frac{6}{7}\right)^{-1} = \frac{7}{6}$ d. $\frac{12^5}{12^7} = \frac{1}{144}$ e. $\left((3^2)^{-2}\right)^{-1} = 3^4 = 81$

2. Write this with exponents: $w \cdot w \cdot 3 \cdot w \cdot y \cdot y \cdot w \cdot -4$

$-12 w^4 y^2$

3. Write a term with a coefficient of w, an exponent of y and a base of x

$w x^y$

4. Determine the value of x. (Calculator OK)

a. $10^{\frac{2}{3}} = x$ b. $\left(\frac{1}{2}\right)^{\frac{2}{5}} = x$ c. $10^x = 1000$ d. $6^x = \frac{1}{36}$

4.64 $.76$ 3 -2

#5-7, Evaluate (calculator OK) if X = 4, M = -2, A = 3 and S = -1

5. $(XM - 1)^3 = (-8 - 1)^3 = -729$ 6. $(M + X)^M = (2)^{-2} = \frac{1}{4}$ or .25 7. $(MAS)^{-1} = (6)^{-1} = .17$

Use all of the rules of exponents to simplify the following:

8. $(5y)^{-2} = \frac{1}{25y^2}$ 9. $3x^{-4} = \frac{3}{x^4}$ 10. $w^3 \cdot w^4 \cdot w^5 = w^{12}$ 11. $(3xy^2)(-2xy) = -6x^2y^3$

12. $(4z^5)(2z^3)^2 = 4z^5 \cdot 4z^6 = 16z^{11}$ 13. $(3a \cdot 2b)^3 = (6ab)^3 = 216a^3b^3$ 14. $(-m^2)^3 = -1m^6$ 15. $\frac{x^6}{x^{10}} = \frac{1}{x^4}$

16. $x^3 \cdot \frac{2}{x^7} = \frac{2}{x^4}$ 17. $\frac{3x^2y^2}{3xy} \cdot \frac{6xy^3}{3y} = \frac{18x^3y^5}{9xy^2} = 2x^2y^3$ 18. $\frac{4ab^3}{2b} \div \frac{5ab^{-3}}{a^2} = \frac{4a^3b^3}{10ab^{-2}} = \frac{2a^2b^5}{5}$ 19. $\frac{-9x^5y^7}{x^2y^3} \cdot \frac{(2xy)^2}{-6x^2y} = \frac{-36x^7y^9}{-6x^4y^5} = 6x^3y^4$

#20-22, Fill in what is missing to make the equation true.

20. $3^2 \cdot [?] = 3^{10}$ 21. $(w^5)[?] = \frac{1}{w^3}$ 22. $m^3 \cdot [?] = \frac{1}{m^7}$ 23. $(2x^3y)(?) = -6x^4y^5$

3^8 w^{-8} m^{-10} $-3xy^4$

#24-27, Write each in scientific notation.

24. .00756 25. 43,210,000 26. 0.25 27. 800

7.56×10^{-3} 4.32×10^7 2.5×10^{-1} 8×10^2

#28-31, Write each as a decimal.

28. 4.78×10^6 29. 1.11×10^{-1} 30. 9.87×10^5 31. 3×10^3

$4,780,000$ $.111$ $987,000$ 3000

32. Create a problem involving exponents that will simplify to the answer $.4x^2y^5$

example: $(4xy^3)(xy^2)$