Name _____ Class _____ Date _____

Practice 8-7

Example Exercises

Example 1

Simplify each expression. Use positive exponents.

1. $(x^2)^3$ **2.** $(a^4)^2$ **3.** $(2^3)^2$ **4.** $(d^3)^{-2}$

5. $(b^{-7})^2$ **6.** $(m^{-2})^{-4}$ **7.** $(3^{-2})^2$ **8.** $x^2 \cdot (x^2)^5$

9. $(y^3)^4$ **10.** $d^2 \cdot (d^3)^4$ **11.** $n^8 \cdot (n^{-2})^2$ **12.** $(a^3)^{-3} \cdot a^5$

13. $3^2 \cdot (3^2)^2$ **14.** $x \cdot (x^4)^6$ **15.** $b^{-3} \cdot (b^2)^3$ **16.** $(y^3)^{-5} \cdot y^{20}$

Example 2

Simplify each expression. Use positive exponents.

17. $(xy)^3$ **18.** $(x^2y)^4$ **19.** $(m^{-2}n^3)^{-2}$

20. $(5a^3)^2$ **21.** $(7b^{-1})^2$ **22.** $(2a^2b^3)^2$

23. $a^3 \cdot (a^2b)^4$ **24.** $(x^{-2})^3(x^2y^3)^4$ **25.** $(6x^2)^2(3x^2y)^3$

26. $(m^2)^{-4}(m^2n^3)^2$ **27.** $(x^3y^2)^2(xy^3)^4$ **28.** $(a^2b^3)^{-1}(a^{-2}b)^{-5}$

Example 3

Multiply. Give your answers in scientific notation.

29. $(3 \times 10^4)^3$ **30.** $(3 \times 10^{-5})^2$ **31.** $(8 \times 10^{10})^2$

32. $(4 \times 10^{-7})^2$ **33.** $(6 \times 10^7)^3$ **34.** $(2 \times 10^3)^5$

35. $(2 \times 10^6)^{-2}$ **36.** $10^3 \cdot (5 \times 10^8)^2$ **37.** $10^2 \cdot (6 \times 10^9)^2$

38. $10^{-4} \cdot (3 \times 10^4)^2$ **39.** $10^{-7} \cdot (5 \times 10^3)^3$ **40.** $(10^5)^2(8 \times 10^{-4})^2$

41. The Earth is shaped somewhat like a sphere. The volume of a sphere can be calculated by using the formula $V = \frac{4}{3}\pi r^3$. The radius of the Earth is 2.1×10^7 ft. What is the volume of the Earth?

42. The volume of a cylindrical water storage tank can be calculated by using the formula $V = 3.14r^2h$. The radius of the tank is 1×10^2 ft. The height of the tank is 5×10^1 ft. What is the volume of the tank?

43. The kinetic energy, in joules, of a moving object can be found by using the formula $E = \frac{1}{2}mv^2$, where m is the mass and v is the speed of the object. The mass of a proton is 1.67×10^{-27} kg. Find the kinetic energy of a proton traveling 2.5×10^8 m/s.