

7-3

Practice

Form K

More Multiplication Properties of Exponents

Simplify each expression.

1. $(v^4)^2 v^8$

2. $(a^5)^7 a^{12}$

3. $(n^4)^{-6} \frac{1}{n^{24}}$

4. $h(h^{-3})^{-10} h^{31}$

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

6. $(3q)^5 243q^5$

7. $(a^4)^6 (b^5)^{-2} \frac{a^{24}}{b^{10}}$

8. $(m^2)^8 (n^0)^4 m^{16}$

9. $(2t^{\frac{1}{2}})^{-4} \frac{1}{16t^2}$

10. $(5k^9)^{-3} \frac{1}{125k^{27}}$

11. $(3s^4)^3 s^2 27s^{14}$

12. $(bc^3)^{\frac{1}{5}} b^{\frac{1}{5}} c^{\frac{3}{5}}$

13. $\left(mn^{\frac{2}{5}}p\right)^0 1$

14. $\left(f^2g^{\frac{3}{2}}\right)\left(fg^4\right)^{-1} \frac{f}{g^{\frac{5}{2}}}$

15. $a(a^{-3}b^{-4})^{-2}b^{-3} a^7b^5$

16. $(5x^{-2})^2(y^7z^{-5})^{-4} \frac{25z^{20}}{x^4y^{28}}$

17. $c^{10}\left(c^{\frac{1}{3}}d^{-3}\right)^4 d^3 \frac{c^{11}}{d^9}$

18. $7t^{11}u^3(-4t^{-9})^2u^{-5} \frac{112}{t^7u^2}$

Simplify. Write each answer in scientific notation.

19. $(4 \times 10^3)^2$
 1.6×10^7

20. $(7 \times 10^8)^4$
 2.401×10^{35}

21. $(1.4 \times 10^{-8})^3$
 2.744×10^{-24}

22. $(5 \times 10^{-7})^3$
 1.25×10^{-19}

23. $(2.5 \times 10^{10})^2$
 6.25×10^{20}

24. $(4.8 \times 10^4)^{-2}$
 4.3×10^{-10}

25. The radius of a cylinder is 2.9×10^5 in. The height of the cylinder is 3.8×10^4 in. What is the volume of the cylinder? (Hint: $V = \pi r^2 h$)
 $1 \times 10^{16} \text{ in.}^3$

26. The side length of a square is 9.5×10^2 cm. What is the area of the square?
 $9.025 \times 10^5 \text{ cm}^2$

7-3

Practice (continued)

Form K

More Multiplication Properties of Exponents

Complete each equation.

27. $(n^3)^5 = n^{\square}$ 15

28. $(a^7)^{\square} = a^{-21}$ -3

29. $(j^{\square})^{-8} = j^{-3}$ $\frac{3}{8}$

30. $(t^{-2})^{\square} = t^{\frac{1}{2}}$ $-\frac{1}{4}$

31. $(5g^4)^{\square} = \frac{1}{125g^{12}}$ -3

32. $(m^2n^{-4})^{\square} = \frac{m^4}{n^8}$ 2

33. Reasoning Demonstrate why you multiply the exponents when simplifying $(3^4)^3$.

$$(3^4)^3 = 3^4 \cdot 3^4 \cdot 3^4 = 3^{4+4+4} = 3^{12}$$

Simplify each expression.

34. $(4.895)^{-11}(4.895)^{11}$ 1

35. $-7xy^{-3}z^3(0)^{-10}$ 0

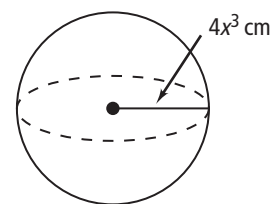
36. $4^{\frac{3}{2}}(8d)^3$ $4096d^3$

37. $(10^8)^{-5}(3.6 \times 10^{-8})^3$ 4.67×10^{-63}

38. The volume of a sphere can be determined by the formula

 $V = \frac{4}{3}\pi r^3$, where r is the radius. Find the volume of the sphere shown at the right in terms of x . Use 3.14 for π .

$$267.95x^9 \text{ cm}^3$$



39. The volume of a circular cone can be determined by the formula

 $V = \frac{1}{3}\pi r^2 h$, where r is the radius of the base and h is the height of the cone. Find the volume of the cone shown at the right in terms of b . Use 3.14 for π .

$$301.44b^8 \text{ in.}^3$$

