

Unit 4.3 More multiplication properties of exponents

PRACTICE

Period: _____

Rewrite each expression using each base only once.

1. $(z^5)^3$

2. $(m^4)^{10}$

3. $(v^7)^{\frac{1}{2}}$

4. $\left(k^{\frac{4}{3}}\right)^3$

5. $(x^7)^{-2}$

6. $\left(r^{\frac{1}{4}}\right)^{-6}$

7. $b(b^{-8})^{-3}$

8. $h^2(h^7)^0$

9. $(m^2)^{\frac{3}{2}}n^{\frac{1}{7}}$

10. $(x^6)^2(y^3)^0$

11. $(g^5)^{-5}(g^6)^{-2}$

12. $(v^2)^3(w^4)^{\frac{1}{3}}$

13. $(6a)^4$

14. $(5f)^{-3}$

15. $(9z)^{\frac{1}{2}}$

16. $(10m^3)^{-2}$

17. $(6j^{-2})^{-3}$

18. $(9d^{10})^{-2}$

19. $(gh)^0$

20. $(qr^6)^{\frac{1}{2}}$

21. $(4a^3)^2a^5$

22. $\left(m^{\frac{4}{7}}n^3\right)^7(m^4)^3$

23. $(xy^2)(xy^2)^{-1}$

24. $z(y^{-5}z^7)^{-1}y^{-5}$

25. $(7t^{-3})^3\left(s^5t^{\frac{1}{4}}\right)^2$

26. $m^{-9}(m^{-1}n)^{\frac{1}{2}}n^8$

27. $(3b^{-4}c^{-2})^6c^3$

28. $5x^{-5}y^2(2x^{-14})^2$

Simplify. Write each answer in scientific notation.

29. $(5 \times 10^7)^2$

30. $(2 \times 10^4)^6$

31. $(9 \times 10^{-12})^2$

32. $(3 \times 10^{-8})^3$

33. $(3.6 \times 10^5)^2$

34. $(9.3 \times 10^{-6})^{-2}$

35. $(1.7 \times 10^{-8})^3$

36. $(6.24 \times 10^{13})^3$

37. The radius of a cylinder is 5.4×10^6 cm. The height of the cylinder is 2.5×10^3 cm. What is the volume of the cylinder? (Hint: $V = \pi r^2 h$)

38. The side length of a square is 9.6×10^5 in. What is the area of the square?

39. The side length of a cube is 3.78×10^3 ft. What is the volume of the cube?

Complete each equation.

40. $(p^4)^\square = p^8$

41. $(z^\square)^6 = z^{-24}$

42. $(t^{12})^\square = 1$

43. $(w^3)^\square = w^{-12}$

44. $(n^{-8})^\square = n$

45. $10(g^2)^\square = 10g^6$

46. $(3a^\square)^3 = 27a^{\frac{3}{2}}$

47. $(6q^4r^\square)^2 = 36q^8$

48. $(x^4y^3)^\square = \frac{1}{x^8y^6}$

49. **Writing** Is $(y^m)^n = (y^n)^m$ a true statement? Explain your reasoning.

50. **Reasoning** What is the difference between x^4x^3 and $(x^4)^3$? Justify your answer.

Simplify each expression.

51. $2^3(2m)^2$

52. $(68.68)^8(68.68)^{-8}$

53. $(d^{\frac{2}{3}})^{-5} d^3$

54. $(-7p)^3 + 7p^3$

55. $4a\left(0\frac{1}{2}\right)b^4(-b)^{-7}$

56. $(10^{-5})^3(9.9 \times 10^{-12})^2$