Practice 8-5

Division Properties of Exponents

Simplify each expression.

1. $\dfrac{c^{15}}{c^9}$

2. $\left(\dfrac{x^3 y^{-2}}{z^{-5}}\right)^{-4}$

3. $\dfrac{x^7 y^9 z^3}{x^4 y^7 z^8}$

4. $\left(\dfrac{a^2}{b^3}\right)^5$

5. $\dfrac{3^7}{3^4}$

6. $\left(\dfrac{a^3}{b^2}\right)^4$

7. $\left(\dfrac{2}{3}\right)^{-2}$

8. $\left(\dfrac{p^{-3} q^{-2}}{q^{-3} r^5}\right)^4$

9. $\dfrac{a^6 b^{-5}}{a^{-2} b^7}$

10. $\dfrac{7^{-4}}{7^{-7}}$

11. $\dfrac{a^7 b^6}{a^5 b}$

12. $\left(\dfrac{a^2 b^{-4}}{b^2}\right)^5$

13. $\left(-\dfrac{3}{2^3}\right)^{-2}$

14. $\dfrac{z^7}{z^{-3}}$

15. $\left(\dfrac{5 a^0 b^4}{c^{-3}}\right)^2$

16. $\dfrac{x^4 y^{-8} z^{-2}}{x^{-1} y^6 z^{-10}}$

17. $\dfrac{m^6}{m^{10}}$

18. $\left(\dfrac{2^3 m^4 n^{-1}}{p^2}\right)^0$

19. $\left(\dfrac{s^{-4}}{t^{-1}}\right)^{-2}$

20. $\left(\dfrac{2 a^3 b^{-2}}{c^3}\right)^5$

21. $\left(\dfrac{x^{-3} y}{x z^{-4}}\right)^{-2}$

22. $\dfrac{h^{-13}}{h^{-8}}$

23. $\dfrac{4^6}{4^8}$

24. $\left(\dfrac{1}{3}\right)^3$

25. $\dfrac{x^5 y^3}{x^2 y^9}$

26. $\left(\dfrac{m^{-3} n^4}{n^{-2}}\right)^4$

27. $\dfrac{4^{-1}}{4^2}$

28. $\left(\dfrac{a^8 b^6}{a^{11}}\right)^5$

29. $\dfrac{n^9}{n^{15}}$

30. $\left(\dfrac{r^3 s^{-1}}{r^2 s^6}\right)^{-1}$

31. $\dfrac{n^{-8}}{n^4}$

32. $\dfrac{m^8 n^3}{m^{10} n^5}$

Simplify each quotient. Write each answer in scientific notation.

33. $\dfrac{3.54 \times 10^{-9}}{6.15 \times 10^{-5}}$

34. $\dfrac{9.35 \times 10^{-3}}{3.71 \times 10^{-5}}$

35. $\dfrac{495 \text{ billion}}{23.9 \text{ million}}$

36. $\dfrac{8 \times 10^9}{4 \times 10^5}$

37. $\dfrac{9.5 \times 10^9}{5 \times 10^{12}}$

38. $\dfrac{6.4 \times 10^9}{8 \times 10^7}$

39. $\dfrac{298 \text{ billion}}{49 \text{ million}}$

40. $\dfrac{1.8 \times 10^{-8}}{0.9 \times 10^3}$

41. $\dfrac{3.6 \times 10^6}{9 \times 10^{-3}}$

42. $\dfrac{8.19 \times 10^7}{4.76 \times 10^{-2}}$

43. $\dfrac{65 \text{ million}}{19.5 \text{ billion}}$

44. $\dfrac{4.9 \times 10^{12}}{7 \times 10^3}$

45. $\dfrac{36.2 \text{ trillion}}{98.5 \text{ billion}}$

46. $\dfrac{3.9 \times 10^3}{1.3 \times 10^8}$

47. $\dfrac{5.6 \times 10^{-5}}{8 \times 10^{-7}}$

48. $\dfrac{40 \text{ million}}{985 \text{ million}}$

49. The half-life of uranium-238 is 4.5×10^9 years. The half-life of uranium-234 is 2.5×10^5 years. How many times greater is the half-life of uranium-238 than that of uranium-234.