

Practice 8-5

Division Properties of Exponents

Simplify each expression.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Simplify each quotient. Write each answer in scientific notation.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.