

### Chapter 3 Section 3: Additional Rules for Exponents

#### Problems

Use the rules for exponents to simplify the following. Eliminate any negative exponents. Try to use the rules from memory; if necessary, you may refer to the table of exponent rules on page 2.

1.  $\frac{10^8}{10^5}$   
\_\_\_\_\_

2.  $\frac{3^8}{3^6}$   
\_\_\_\_\_

3.  $\frac{B^{876}}{B^{765}}$   
\_\_\_\_\_

4.  $\frac{x^{72}}{x^{59}}$   
\_\_\_\_\_

5.  $100^0$   
\_\_\_\_\_

6.  $3^0$   
\_\_\_\_\_

7.  $3^1$   
\_\_\_\_\_

8.  $\left(\frac{\sqrt{Z^2 + 8}}{8Z^2 + 1}\right)^0$   
\_\_\_\_\_

9.  $\frac{x^7}{x^8}$   
\_\_\_\_\_

10.  $\frac{u^{32}}{u^{48}}$   
\_\_\_\_\_

11.  $\frac{7^3}{7^8}$   
\_\_\_\_\_

12.  $\frac{4^4}{4^6}$   
\_\_\_\_\_

13.  $(5^{-1} \cdot 2^{-2})^{-3}$   
\_\_\_\_\_

14.  $(6^{-1} \cdot 5^{-2})^{-2}$   
\_\_\_\_\_

15.  $(3^2 \cdot 4^{-1})^{-2}$   
\_\_\_\_\_

16.  $(2^3 \cdot 7^{-2})^{-2}$   
\_\_\_\_\_

17.  $(5a^{-3}b^{-4})^{-3}$   
\_\_\_\_\_

18.  $(2x^{-5}y^{-6})^{-3}$   
\_\_\_\_\_

19.  $(4x^{-10}y^{-8})^{-4}$   
\_\_\_\_\_

20.  $(7A^{-1}Z^2)^{-2}$   
\_\_\_\_\_

21.  $(2^{-3}x^9y^{-6})^{-2}$   
\_\_\_\_\_

$$22. \left(3^{-2}x^{-6}y^8\right)^{-3}$$

$$23. \left(3A^{-5}\right)^{-2}\left(3^{-3}A^6\right)^{-2}$$

$$24. \left(4^{-3}x^{-7}\right)^{-2}\left(4x^6\right)^{-3}$$

$$25. \frac{x^{-7}y^{-9}}{z^8t^{-5}}$$

$$26. \frac{A^{11}B^{-22}}{C^{-33}D^{44}}$$

$$27. \frac{5^{-2}x^{-4}y^{-1}}{2^3z^{-5}}$$

$$28. \frac{6^{-2}n^{-9}}{5^4m^{-1}}$$

$$29. \left(\frac{2^4u^8}{5^{-2}z^6v^{-3}}\right)^{-2}$$

$$30. \left(\frac{2^3x^6y^{-8}}{2^{-2}x^{-7}y^3}\right)^{-3}$$

$$31. \left(\frac{2A^{-7}}{3^{-1}B^{-4}}\right)^{-3}$$

$$32. \left(\frac{3z^{-7}}{3^{-1}z^{-4}}\right)^{-2}$$

$$33. \left(\frac{2^{-3}x^{-3}}{2^{-5}x^{-2}}\right)^{-3}$$

$$34. \left(\frac{x^{-5}}{x^{-6}y^{-7}}\right)^{-5}$$

$$35. \left(\frac{Q^{-2}R^8}{Q^4R^{-5}}\right)^{-5}$$

Properties of Exponents	
1	$a^1 = a$
2	$a^m \cdot a^n = a^{m+n}$
3	$(ab)^n = a^n \cdot b^n$
4	$(a^m)^n = a^{m \cdot n}$
5	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$
6	$\frac{a^m}{a^n} = a^{m-n}$
7	$a^0 = 1$
8	$a^{-n} = \frac{1}{a^n}$