7-1: ZERO AND NEGATIVE EXPONENTS



EXAMPLE 1: SIMPLIFYING A POWER



Evaluating Exponential Expressions

When you evaluate an exponential expression, you can write the expression with positive exponents before substituting values for the variables.



EXAMPLE 4: REAL-WORLD PROBLEM SOLVING

38. A population of marine bacteria doubles every hour under controlled laboratory conditions. The number of bacteria is modeled by the expression $1000 * 2^h$, where *h* is the number of hours after a scientist measures the population size. Evaluate the expression for h = 0 and h = -3. What does each value of the expression represent in the situation?



		Duethursday	
Name		7-1 Practice Worksheet	Period
Simplify each expression $1(2.57)^0$	2. $\frac{1}{2^0}$	33 ⁻⁴	4. 2 ⁻⁶
5. (-4) ⁻³	64 ⁻³	7. $\frac{5x^{-1}}{y^{-4}}$	8. $\frac{8}{2c^{-3}}$

9.
$$2^{-3}x^2y^0z^{-7}$$
 10. $9y^7t^{-11}$ 11. $\frac{7s^0t^{-5}}{2^{-1}m^2}$ 12. $2^3(5^0 - 6m^2)$

Evaluate each expression for $r = -3$ and $s = 5$.					
13. $(2s)^{-2}$	14. $\frac{1}{r^{-4}s^2}$	15. $r^0 s^{-2}$	16. $2^{-4}r^3s^{-3}$		

17.
$$\frac{3r^{-2}s^3}{9r^3s^{-2}}$$
 18. s'

Is the value of each expression positive or negative?

19. -2^2 20. $(-2)^2$ 21. 2^{-2} 22. $(-2)^{-3}$

23. Simplify $a^n \cdot a^{-n}$. What is the mathematical relationship between the two factors?

24. Which expressions equal $\frac{1}{4}$?I. 4^{-1} II. 2^{-2} III. -2^{-2} IV. $\frac{1}{2^2}$ a) I, II, and III onlyb) I and II onlyc) I, III, and IV onlyd) I, II, and IV only

25. Suppose you are the only person in your class who knows a certain story. After a minute you tell a classmate. Every minute after that, every student who knows the story tells another student (sometimes the person being told already will have heard it). In a class of 30 students, the expression $\frac{30}{1+29 \cdot 2^{-t}}$ predicts the approximate number of people who will have heard the story after *t* minutes.

About how many students will have heard your story after 2 minutes?

After 5 minutes?

After 10 minutes?