

8.1 Practice



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▶ Review & Refresh

Sketch a graph that represents the situation.

1. A trading card becomes more valuable over time. The value increases at a constant rate, and then at a faster and faster rate.
2. The water level of a river remains constant, and then decreases at a constant rate.

The vertices of a figure are given. Rotate the figure as described. Find the coordinates of the image.

3. $A(0, -4), B(0, -1), C(2, -1)$
 90° clockwise about the origin
4. $E(1, 2), F(1, 3), G(4, 3), H(4, 2)$
 180° about the origin

▶ Concepts, Skills, & Problem Solving

USING EXPONENT NOTATION Write the power in repeated multiplication form. Then find the value of the power. (See Exploration 1, p. 319.)

5. 4^4
6. $(-8)^2$
7. $(-2)^3$

WRITING EXPRESSIONS USING EXPONENTS Write the product using exponents.

8. $3 \cdot 3 \cdot 3 \cdot 3$
9. $(-6) \cdot (-6)$
10. $\left(-\frac{1}{2}\right) \cdot \left(-\frac{1}{2}\right) \cdot \left(-\frac{1}{2}\right)$
11. $\frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{3}$
12. $\pi \cdot \pi \cdot \pi \cdot x \cdot x \cdot x \cdot x$
13. $(-4) \cdot (-4) \cdot (-4) \cdot y \cdot y$
14. $6.4 \cdot 6.4 \cdot 6.4 \cdot 6.4 \cdot b \cdot b \cdot b$
15. $(-t) \cdot (-t) \cdot (-t) \cdot (-t) \cdot (-t)$
16. $-(7 \cdot 7 \cdot 7 \cdot 7 \cdot 7)$
17. $-\left(\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4}\right)$

EVALUATING EXPRESSIONS Evaluate the expression.

18. 5^2
19. -11^3
20. $(-1)^6$
21. $\left(\frac{1}{2}\right)^6$
22. $\left(-\frac{1}{12}\right)^2$
23. $-\left(\frac{1}{9}\right)^3$

24. **(MP) YOU BE THE TEACHER** Your friend evaluates the power -6^2 . Is your friend correct? Explain your reasoning.

$$-6^2 = (-6) \cdot (-6) = 36$$

MP STRUCTURE Write the prime factorization of the number using exponents.

25. 675

26. 280

27. 363



28. **MP PATTERNS** The largest doll is 12 inches tall. The height of each of the other dolls is $\frac{7}{10}$ the height of the next larger doll. Write an expression involving a power that represents the height of the smallest doll. What is the height of the smallest doll?

USING ORDER OF OPERATIONS Evaluate the expression.

29. $5 + 3 \cdot 2^3$

30. $2 + 7 \cdot (-3)^2$

31. $(13^2 - 12^2) \div 5$

32. $\frac{1}{2}(4^3 - 6 \cdot 3^2)$

33. $\left| \frac{1}{2}(7 + 5^3) \right|$

34. $\left| \left(-\frac{1}{2} \right)^3 \div \left(\frac{1}{4} \right)^2 \right|$

35. $(9^2 - 15 \cdot 2) \div 17$

36. $-6 \cdot (-5^2 + 20)$

37. $(-4 + 12 - 6^2) \div 7$

38. **MP STRUCTURE** Copy and complete the table. Compare the values of $2^h - 1$ with the values of 2^{h-1} . When are the values the same?

h	1	2	3	4	5
$2^h - 1$					
2^{h-1}					

39. **MP MODELING REAL LIFE** Scientists use carbon-14 dating to determine the age of a sample of organic material.
- The amount C (in grams) of carbon-14 remaining after t years of a sample of organic material is represented by the equation $C = 100(0.99988)^t$. Find the amount of carbon-14 remaining after 4 years.
 - What percent of the carbon-14 remains after 4 years?

40. **DIG DEEPER!** The frequency (in vibrations per second) of a note on a piano is represented by the equation $F = 440(1.0595)^n$, where n is the number of notes above A440. Each black or white key represents one note. Use the frequencies of A and A440 to make a conjecture about frequencies of notes on a piano. Explain your reasoning.

