Name: **School:** **Grade:** **Class:**

1-3 Powers and Exponents - Practice and Problem Solving

Write each product using an exponent.

11. $8 \times 8 \times 8 \times 8$

$8 \times 8 \times 8 \times 8 = 8^4$

13. $5 \times 5 \times 5 \times 5 \times 5$

$5 \times 5 \times 5 \times 5 \times 5 = 5^5$

15. $7 \times 7 \times 7 \times 7 \times 7 \times 7$

$7 \times 7 \times 7 \times 7 \times 7 \times 7 = 7^6$

Write each power as a product of the same factor. Then find the value.

17. 3^2

$3^2 = 3 \times 3$
$= 9$

19. 10^5

$10^5 = 10 \times 10 \times 10 \times 10 \times 10$
$= 100,000$

21. 6^5

$6^5 = 6 \times 6 \times 6 \times 6 \times 6$
$= 7,776$

23. 1^7

$1^7 = 1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1$
$= 1$

25. **TEETH** A single tusk that weighed just over 2^8 pounds from an African elephant is the largest tooth ever recorded from any modern animal. About how many pounds did the tusk weigh?

$2^8 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$
$= 256$

Write the prime factorization of each number using exponents.

27. 56

The prime factorization of 56 is $2 \times 2 \times 2 \times 7$. This can be written as $56 = 2^3 \times 7$.

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29. 68

The prime factorization of 68 is $2 \times 2 \times 17$. This can be written as $68 = 2^2 \times 17$.

31. 98

The prime factorization of 98 is $2 \times 7 \times 7$. This can be written as $98 = 2 \times 7^2$.

33. 378

The prime factorization of 378 is
$2 \times 3 \times 3 \times 3 \times 7$. This can be written as
$378 = 2 \times 3^3 \times 7$.

Write each power as a product of the same factor. Then find the value.

35. seven squared

seven squared $= 7 \times 7$
$= 49$

37. four to the fifth power

four to the fifth power $= 4 \times 4 \times 4 \times 4 \times 4$
$= 1,024$

39. **HOBBIES** A knitted scarf is made by joining 20 square blocks that are each made up of 20 rows of 20 stitches. How many total stitches does the scarf contain? Write using exponents, and then find the value.

$20 \times 20 \times 20 = 20^3 = 8{,}000$

41. **NUMBER SENSE** Which is greater: 3^5 or 5^3? Explain your reasoning.

3^5; $3^5 = 243$ and $5^3 = 125$ because the base in 3^5 is used as a factor more times than in 5^3.

CHALLENGE Refer to the table.

Powers of 3	Powers of 5	Powers of 10
$3^4 = 81$	$5^4 = 625$	$10^4 = 10{,}000$
$3^3 = 27$	$5^3 = 125$	$10^3 = 1{,}000$
$3^2 = 9$	$5^2 = 25$	$10^2 = 100$
$3^1 = 3$	$5^1 = 5$	$10^1 = 10$
$3^0 = \blacksquare$	$5^0 = \blacksquare$	$10^0 = \blacksquare$

43. Describe the pattern for the powers of 3. Find 3^0.

The next value is found by dividing the previous power by 3; $3^0 = 1$.

45. Describe the pattern for the powers of 10. Find 10^1 and 10^0.

The next value is found by dividing the previous power by 10; $10^1 = 10; 10^0 = 1$.

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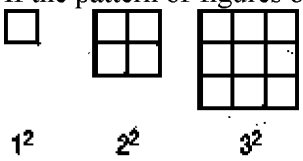
47. If the pattern of figures below continues, which value represents the seventh figure in the pattern?



A 7^2
B 1^7
C 7^7
D 3^7

The seventh figure will represent 7×7, or 7^2.
The correct answer is A.

Tell whether each number is *prime*, *composite*, or *neither*.

49. 63

63 has more than 2 factors, 1, 63, 3, 21, 7, and 9, so it is composite.

51. 29

29 has only 2 factors, 1 and 29, so it is prime.

53. **TIME** Find the number of seconds in a day if there are 60 seconds in a minute.

There are 60 seconds in a minutes and 60 minutes in 1 hour. So there are 60×60 or 3,600 seconds in 1 hour. There are 24 hours in 1 day. So there are $3{,}600 \times 24$ or 86,400 seconds in 1 day.

PREREQUISITE SKILL Divide.

55. $45 \div 5$

$45 \div 5 = 9$

57. $120 \div 6$

$120 \div 6 = 20$