NAME _____ DATE _____ PERIOD ____

1-4 Study Guide and Intervention

Powers and Exponents

A product of prime factors can be written using exponents and a base. Numbers expressed using exponents are called **powers**.

Powers	Words	Expression	Value
4^2	4 to the second power or 4 squared	4×4	16
5^6	5 to the sixth power	$5 \times 5 \times 5 \times 5 \times 5 \times 5$	15,625
7^4	7 to the fourth power	$7 \times 7 \times 7 \times 7$	2,401
9^3	9 to the third power or 9 cubed	$9 \times 9 \times 9$	729

EXAMPLE 1 **Write $6 \cdot 6 \cdot 6$ using an exponent. Then find the value of the power.**

The base is 6. Since 6 is a factor 3 times, the exponent is 3.
$6 \cdot 6 \cdot 6 = 6^3$ or 216

EXAMPLE 2 **Write 2^4 as a product. Then find the value of the product.**

The base is 2. The exponent is 4. So, 2 is a factor 4 times.
$2^4 = 2 \cdot 2 \cdot 2 \cdot 2$ or 16

EXAMPLE 3 **Write the prime factorization of 225 using exponents.**

The prime factorization of 225 can be written as $3 \times 3 \times 5 \times 5$, or $3^2 \times 5^2$.

EXERCISES

Write each product using an exponent. Then find the value of the power.

1. $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$
2. $9 \cdot 9$
3. $3 \cdot 3 \cdot 3$
4. $5 \cdot 5 \cdot 5$
5. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$
6. $10 \cdot 10$

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

7. 7^2
8. 4^3
9. 8^4
10. 5^5
11. 2^8
12. 7^3

Write the prime factorization of each number using exponents.

13. 40
14. 75
15. 100
16. 147

NAME _____ DATE _____ PERIOD ____

1-4

Practice: Skills

Powers and Exponents

Write each expression in words.

1. 7^2

2. 8^3

3. 4^4

4. 5^6

Write each product using an exponent. Then find the value of the power.

5. $4 \cdot 4 \cdot 4 \cdot 4$

6. $3 \cdot 3 \cdot 3 \cdot 3$

7. $5 \cdot 5 \cdot 5 \cdot 5$

8. $7 \cdot 7$

9. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

10. $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

11. $6 \cdot 6 \cdot 6$

12. $6 \cdot 6 \cdot 6 \cdot 6$

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

13. 3^8

14. 2^5

15. 8^3

16. 10^5

17. 6^2

18. 7^4

19. 2^3

20. 3^5

21. 6^5

22. 2^7

Write the prime factorization of each number using exponents.

23. 54

24. 36

25. 63

26. 245

Lesson 1–4

NAME _____ DATE _____ PERIOD ____

3-1 Study Guide and Intervention

Representing Decimals

Decimals can be written in standard form and expanded form.

Standard form is the usual way to write a decimal, such as 3.52. **Expanded form** is a sum of the products of each digit and its place, such as $(3 \times 1) + (5 \times 0.1) + (2 \times 0.01)$.

EXAMPLE 1 **Write 128.0732 in word form.**

Place-Value Chart							
thousands	hundreds	tens	ones	tenths	hundredths	thousandths	ten-thousandths
0	1	2	8	0	7	3	2

In words, 128.0732 is *one hundred twenty-eight and seven hundred thirty-two ten-thousandths.*

EXAMPLE 2 **Write *ninety-nine and two hundred seven thousandths* in standard form and expanded form.**

Place-Value Chart							
thousands	hundreds	tens	ones	tenths	hundredths	thousandths	ten-thousandths
0	0	9	9	2	0	7	0

Standard form: 99.207
Expanded form: $(9 \times 10) + (9 \times 1) + (2 \times 0.1) + (0 \times 0.01) + (7 \times 0.001)$

Lesson 3–1

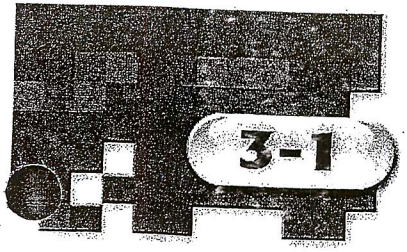
EXERCISES

Write each decimal in word form.

1. 2.3
2. 0.68
3. 32.501
4. 0.0036

Write each decimal in standard form and expanded form.

5. twenty and two hundredths
6. seven and five tenths
7. three hundred four ten-thousandths
8. eleven thousandths



NAME _____ DATE _____ PERIOD ____

Practice: Word Problems

Representing Decimals

BASEBALL For Exercises 1–4, use the table.

The table shows lifetime batting averages for leading baseball players.

Lifetime Batting Averages for Leading Players		
Player	**Team**	**Batting Average**
Tony Gwynn	San Diego Padres	0.338
Mike Piazza	New York Mets	0.325
Derek Jeter	New York Yankees	0.320
Vladimir Guerrero	Montreal Expos	0.319
Edgar Martinez	Seattle Mariners	0.319

1. Write Mike Piazza's batting average in word form.

2. Which digit is in the thousandths place of each player's batting average?

3. What is the batting average for the New York Yankees player in expanded form?

4. Which player's average has a 3 in the hundredths place?

5. BUILDING When measuring board footage for some exotic woods, a carpenter must use 1.25 for thickness rather than 1 in her calculations. Write 1.25 in expanded form.

6. TRAVEL The summer camp Jason attends is exactly four hundred twenty-three and four tenths of a mile from his home. Write *four hundred twenty-three and four tenths* in standard form.

Lesson 3–1

NAME _____ DATE _____ PERIOD ____

3-1

Practice: Skills

Representing Decimals

Write each decimal in word form.

1. 6.5

2. 0.3

3. 39.2

4. 0.83

5. 5.67

6. 14.006

7. 12.001

8. 0.5214

9. 12.0905

Write each decimal in standard form and expanded form.

10. three tenths

11. fifteen and one tenth

12. eight and four hundredths

13. seventy-two and sixteen thousandths

14. one hundred and one hundredth

15. four hundred seven thousandths

16. four hundred seven ten-thousandths

17. one hundred and one thousandth

18. Express $(2 \times 100) + (3 \times 10) + (1 \times 1) + (4 \times 0.1) + (5 \times 0.01)$ in word form.

NAME _____ DATE _____ PERIOD ____

1-4 Study Guide and Intervention

Powers and Exponents

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Powers	Words	Expression	Value
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EXAMPLE 3 **Write the prime factorization of 225 using exponents.**

The prime factorization of 225 can be written as $3 \times 3 \times 5 \times 5$, or $3^2 \times 5^2$.

EXERCISES

Write each product using an exponent. Then find the value of the power.

1. $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$
2. $9 \cdot 9$
3. $3 \cdot 3 \cdot 3$
4. $5 \cdot 5 \cdot 5$
5. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$
6. $10 \cdot 10$

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

7. 7^2
8. 4^3
9. 8^4
10. 5^5
11. 2^8
12. 7^3

Write the prime factorization of each number using exponents.

13. 40
14. 75
15. 100
16. 147

NAME _____ DATE _____ PERIOD ____

1-4

Practice: Word Problems

Powers and Exponents

1. **SPACE** The Sun is about $10 \cdot 10$ million miles away from Earth. Write $10 \cdot 10$ using an exponent. Then find the value of the power. How many miles away is the Sun?

2. **WEIGHT** A 100-pound person on Earth would weigh about $4 \cdot 4 \cdot 4 \cdot 4$ pounds on Jupiter. Write $4 \cdot 4 \cdot 4 \cdot 4$ using an exponent. Then find the value of the power. How much would a 100-pound person weigh on Jupiter?

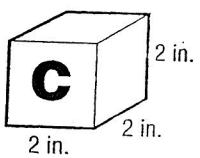
3. **ELECTIONS** In the year 2000, the governor of Washington, Gary Locke, received about 10^6 votes to win the election. Write this as a product. How many votes did Gary Locke receive?

4. **SPACE** The diameter of Mars is about 9^4 kilometers. Write 9^4 as a product. Then find the value of the product.

5. **SPACE** The length of one day on Venus is 3^5 Earth days. Express this exponent as a product. Then find the value of the product:

6. **GEOGRAPHY** The area of San Bernardino County, California, the largest county in the U.S., is about 3^9 square miles. Write this as a product. What is the area of San Bernardino County?

7. **GEOMETRY** The volume of the block shown can be found by multiplying the width, length, and height. Write the volume using an exponent. Find the volume.



8. **SPACE** A day on Jupiter lasts about 10 hours. Write a product and an exponent to show how many hours are in 10 Jupiter days. Then find the value of the power.

NAME _____ DATE _____ PERIOD _____

1-9 Study Guide and Intervention

Scientific Notation

A number is in scientific notation when it is written as the product of a number and a power of ten. The number must be greater than or equal to 1 and less than 10.

- To write a number in standard form, you apply the order of operations. First evaluate the power of ten and then multiply.
- To write a number in scientific notation, move the decimal point to the right of the first nonzero number. Then, find the power of ten by counting the number of places moved.

EXAMPLE 1 **Write 6.1×10^3 in standard form.**

$6.1 \times 10^3 = 6.1 \times 1{,}000$ $10^3 = 1{,}000$

$= 6.100$ Move the decimal point 3 places to the right.

$= 6{,}100$

EXAMPLE 2 **Write 62,500 in scientific notation.**

$62{,}500 = 6.250 \times 10{,}000$ Move the decimal point 4 places to get a number between 1 and 10.

$= 6.25 \times 10^4$

EXERCISES

Write each number in standard form.

1. 7.25×10^2
2. 2.5×10^3
3. 9.95×10^5
4. 8.80×10^4
5. 3.18×10^6
6. 6.12×10^3

Write each number in scientific notation.

7. 325
8. 9,210
9. 200
10. 5,120
11. 561
12. 1,230
13. 21,300
14. 53,000
15. 8,930

Lesson 1–9

Lesson 52 Perfect Squares and Square Roots

SOL 6.22

Ready Reference

perfect square a number that results from multiplying any whole number by itself
example: $6 \times 6 = 6^2 = 36$, so 36 is a perfect square

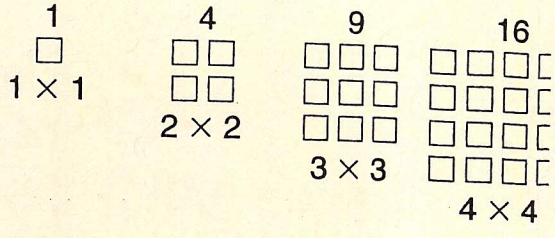
square root one of two identical factors of a given number
example: $\sqrt{36}$: 6 is the square root of 36, since $6^2 = 6 \times 6 = 36$

array an arrangement that shows objects in rows and columns

Think About It

Perfect squares, or square numbers, get their name because they make square figures when set in arrays. The numbers 1, 4, 9, and 16 are examples of perfect squares.

What are the next 4 perfect squares?



Here's How

Find perfect squares.

1. Determine how the first four perfect squares were made. To make a perfect square, multiply a whole number by itself.

$1 \times 1 = 1$ $2 \times 2 = 4$ $3 \times 3 = 9$ $4 \times 4 = 16$

2. Multiply the next four factors. Since 1, 2, 3, and 4 were each multiplied to make the first four perfect squares, use 5, 6, 7, and 8 to make the next four perfect squares.

$5 \times 5 = 25$ $6 \times$ _____ = _____

_____ × _____ = _____ _____ × _____ = _____

The next four perfect squares are _____ _____ _____ and _____.

How are the operations of squaring a number and finding the square root of a number related? They are inverse operations, just as addition and subtraction or multiplication and division are inverse operations. For some numbers, you can use basic facts to determine whether a number is a perfect square. For other numbers, you can use a calculator.

Find the square root of a perfect square.

What is $\sqrt{49}$? Is 49 a perfect square?

Step 1 $7 \times 7 = 49$. So _____ is the square root of 49.

$\sqrt{49}$ = _____

Step 2 Is 49 a perfect square?
49 is the product of 7 and 7, so 49 is a _____.

For the square root of a number that is not a perfect square, you can find only an approximate value.

Find the square root of a number rounded to the nearest tenth.

What is $\sqrt{38}$ to the nearest tenth?

Step 1 Use a calculator to find the square root of 38.

$\sqrt{38} \approx$ _____

Step 2 Round 6.164414003 to the nearest tenth.

6.164414003 ≈ _____

What is $\sqrt{38}$ to the nearest tenth? _____

Practice

1. What is $\sqrt{16}$?

   A 1
   B 4
   C 8
   D 16

2. What is $\sqrt{100}$?

   F 2
   G 5
   H 10
   J 50

3. Which number is a perfect square?

   A 2
   B 4
   C 6
   D 8

4. Which number is a perfect square?

   F 5
   G 10
   H 15
   J 25

5. What is $\sqrt{144}$?

   A 12
   B 13
   C 36
   D 72

6. What is $\sqrt{11^2}$?

   F 11
   G 22
   H 121
   J 242

7 What is $\sqrt{5}$ rounded to the nearest tenth?

A 2.1
B 2.2
C 2.5
D 2.9

8 What is $\sqrt{30}$ rounded to the nearest tenth?

F 3.1
G 5.4
H 5.5
J 15

9 What is the value of the expression $\sqrt{9} + 3^2$?

A 3
B 6
C 9
D 12

10 What is the value of the expression $\sqrt{25^2} + (\sqrt{25})^2$?

F 10
G 25
H 30
J 50

11 Which are the next two terms in the sequence?

1, 4, 9, 16, 25, 36, 49, 64, ___, ___

A 72, 80
B 80, 90
C 81, 100
D 90, 100

12 What is $\sqrt{120}$, rounded to the nearest tenth?

F 10.9
G 11.0
H 11.1
J 12.0

13 What is $\sqrt{625}$?

A 25
B 55
C 75
D 125

14 What is $\sqrt{40{,}000}$?

F 20
G 200
H 2,000
J 20,000

15 Which number is a perfect square?

A 200
B 400
C 600
D 800

16 What is the value of the expression $\sqrt{4} + \sqrt{4}$?

F $\sqrt{4}$
G 4
H 8
J $\sqrt{8}$

What is $\sqrt{26}$, rounded to the nearest tenth?

A 5

B 5.1

C 5.4

D 13.1

18 $\sqrt{150}$ is between which two consecutive whole numbers?

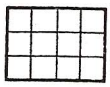
F 10 and 11

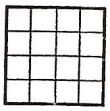
G 11 and 12

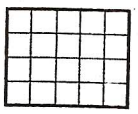
H 12 and 13

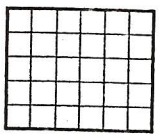
J 13 and 14

Which of the following is a perfect square?

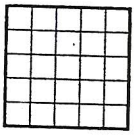
A 

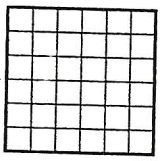
B 

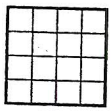
C 

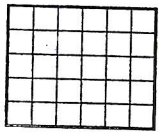
D 

20 Which of the following has 5 as the square root?

F 

G 

H 

J 

square root is between which two consecutive whole numbers?

$\sqrt{13}$

22 $\sqrt{200}$

23 $\sqrt{94}$

_____ _____ _____

each square root to the nearest tenth.

$\sqrt{18}$

25 $\sqrt{94}$

26 $\sqrt{37}$

_____ _____ _____

square has an area of 36 square inches. What is the length of each side of the square?
xplain how you found your answer.

_____

Sixth Grade
Math Vocabulary
S.O. L. 6.22 - Functions

1. Scientific Notations	A number written as the product of a number and a power of ten. The number must be greater than or equal to 1 and less than 10.
2. Standard Form	A number written using digits by first evaluating the power of ten and then multiplying.
3. Square Number	A number that is the product of a whole number and itself.
4. Square Roots	One of the two equal factors of a number.
5. Perfect Squares	A square of a whole number.
6. Exponents	The numbers that indicates how many times the base is used as a factor.
7. Exponential Form	A number is written with a base and an exponent.
8. Powers	A number produced by raising a base to an exponent.

Name _____ Date _____ Class _____

LESSON 1-3

Problem Solving

Exponents

1. The Sun is the center of our solar system. The Sun is the star closest to our planet. The surface temperature of the Sun is close to 10,000°F. Write 10,000 using exponents.

_____

2. Patty Berg has won 4^2 major women's titles in golf. Write 4^2 in standard form.

_____

3. William has 3^3 baseball cards and 4^3 football cards. Write the number of baseball cards and footballs cards that William has.

_____

_____

4. Michelle recorded the number of miles she ran each day last year. She used the following expression to represent the total number of miles: $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$. Write this expression using exponents. How many miles did Michelle run last year?

_____

Choose the letter for the best answer.

5. In Tyrone's science class he is studying cells. Cell A divides every 30 minutes. If Tyrone starts with two cells, how many cells will he have in 3 hours?

A 6 cells

B 32 cells

C 128 cells

D 512 cells

6. Tanisha's soccer team has a phone tree in case a soccer game is postponed or cancelled. The coach calls 2 families. Then each family calls 2 other families. How many families will be notified during the 4^{th} round of calls?

F 2 families

G 4 families

H 8 families

J 16 families

7. The Akashi-Kaiko Bridge is the longest suspension bridge in the world. It is located in Kobe-Naruto, Japan and was completed in 1998. It is about 3^8 feet long. Write the approximate length of the Akashi-Kaiko Bridge in standard form.

A 6,561 feet

B 2,187 feet

C 512 feet

D 24 feet

8. The Strahov Stadium is the largest sports stadium in the world. It is located in Prague, Czech Republic. Its capacity is about 12^5 people. Write the capacity of the Strahov Stadium in standard form.

F 60 people

G 144 people

H 20,736 people

J 248,832 people

Name _____
Class Period
Date

Square Roots Worksheet - Perfect Squares

1a.	$\sqrt{9}$	1b.	$\sqrt{196}$	1c.	$\sqrt{1}$
2a.	$\sqrt{4}$	2b.	$\sqrt{64}$	2c.	$\sqrt{0}$
3a.	$\sqrt{49}$	3b.	$\sqrt{144}$	3c.	$\sqrt{100}$
4a.	$\sqrt{36}$	4b.	$\sqrt{16}$	4c.	$\sqrt{225}$
5a.	$\sqrt{81}$	5b.	$\sqrt{121}$	5c.	$\sqrt{25}$

Name _____ Date _____ Class____

SOL 6.22 Square Root

Vocabulary Test

Word Bank

Square Root Power Scientific Notation

Square Perfect Square

1. _____ is a number that is multiplied by itself and can be expressed with the exponent 2.

2. _____ is the value of a number represented by a base and a exponent.

3. _____ is a number that has an integer as its square root.

4. _____ is a method of writing very large or very small numbers by using powers of 10.

5. _____ is one of the two equal factors of a number .

S.O.L. 6.22
Square Roots Notes

Finding the square root of a number is the inverse operation of squaring that number. Remember, the square of a number is that number times itself.

$$\text{square of } n = n^2$$
$$\text{square of } 5 = 5 \times 5 = 5^2 = 25$$

The perfect squares are the squares of the whole numbers.

Perfect squares:
1, 4, 9, 16, 25, 36, 49, 64, 81, 100

The square root of a number, n, written below is the number that gives n when multiplied by itself.

$$\sqrt{n}$$

$$\sqrt{100} = 10$$
because $10 \times 10 = 100$

Many mathematical operations have an inverse, or opposite, operation. Subtraction is the opposite of addition, division is the inverse of multiplication, and so on. Squaring, which we learned about in a previous lesson (exponents), has an inverse too, called "finding the square root." Remember, the square of a number is that number times itself. The perfect squares are the squares of the whole numbers: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100 ...

The square root of a number, n, written

$\sqrt{n}$ is the number that gives n when multiplied by itself. For example,

$\sqrt{100} = 10$ because 10 x 10 = 100

Perfect Squares Chart

n	n^2	n	n^2	n	n^2	n	n^2
0	0	25	625	50	2500	75	5625
1	1	26	676	51	2601	76	5776
2	4	27	729	52	2704	77	5929
3	9	28	784	53	2809	78	6084
4	16	29	841	54	2916	79	6241
5	25	30	900	55	3025	80	6400
6	36	31	961	56	3136	81	6561
7	49	32	1024	57	3249	82	6724
8	64	33	1089	58	3364	83	6889
9	81	34	1156	59	3481	84	7056
10	100	35	1225	60	3600	85	7225
11	121	36	1296	61	3721	86	7396
12	144	37	1369	62	3844	87	7569
13	169	38	1444	63	3969	88	7744
14	196	39	1521	64	4096	89	7921
15	225	40	1600	65	4225	90	8100
16	256	41	1681	66	4356	91	8281
17	289	42	1764	67	4489	92	8464
18	324	43	1849	68	4624	93	8649
19	361	44	1936	69	4761	94	8836
20	400	45	2025	70	4900	95	9025
21	441	46	2116	71	5041	96	9216
22	484	47	2209	72	5184	97	9409
23	529	48	2304	73	5329	98	9604
24	576	49	2401	74	5476	99	9801

Perfect Squares Chart

n	n^2	n	n^2	n	n^2	n	n^2
0	0	25	625	50	2500	75	5625
1	1	26	676	51	2601	76	5776
2	4	27	729	52	2704	77	5929
3	9	28	784	53	2809	78	6084
4	16	29	841	54	2916	79	6241
5	25	30	900	55	3025	80	6400
6	36	31	961	56	3136	81	6561
7	49	32	1024	57	3249	82	6724
8	64	33	1089	58	3364	83	6889
9	81	34	1156	59	3481	84	7056
10	100	35	1225	60	3600	85	7225
11	121	36	1296	61	3721	86	7396
12	144	37	1369	62	3844	87	7569
13	169	38	1444	63	3969	88	7744
14	196	39	1521	64	4096	89	7921
15	225	40	1600	65	4225	90	8100
16	256	41	1681	66	4356	91	8281
17	289	42	1764	67	4489	92	8464
18	324	43	1849	68	4624	93	8649
19	361	44	1936	69	4761	94	8836
20	400	45	2025	70	4900	95	9025
21	441	46	2116	71	5041	96	9216
22	484	47	2209	72	5184	97	9409
23	529	48	2304	73	5329	98	9604
24	576	49	2401	74	5476	99	9801

Name: _____

Calculate the root of each value.

1. $\sqrt[4]{81}$ = ____ 2. $\sqrt[4]{625}$ = ____ 3. $\sqrt{36}$ = ____ 4. $\sqrt{25}$ = ____ 5. $\sqrt{49}$ = ____

6. $\sqrt[4]{16}$ = ____ 7. $\sqrt{1}$ = ____ 8. $\sqrt{4}$ = ____ 9. $\sqrt[3]{729}$ = ____ 10. $\sqrt[4]{256}$ = ____

11. $\sqrt{100}$ = ____ 12. $\sqrt[3]{125}$ = ____ 13. $\sqrt[4]{1}$ = ____ 14. $\sqrt[3]{1}$ = ____ 15. $\sqrt{441}$ = ____

16. $\sqrt{729}$ = ____ 17. $\sqrt{324}$ = ____ 18. $\sqrt{9}$ = ____ 19. $\sqrt[3]{216}$ = ____ 20. $\sqrt[3]{64}$ = ____

21. $\sqrt{81}$ = ____ 22. $\sqrt{64}$ = ____ 23. $\sqrt[3]{8}$ = ____ 24. $\sqrt[3]{343}$ = ____ 25. $\sqrt{900}$ = ____

26. $\sqrt[3]{512}$ = ____ 27. $\sqrt{1,024}$ = ____ 28. $\sqrt{16}$ = ____ 29. $\sqrt{484}$ = ____ 30. $\sqrt[3]{27}$ = ____

31. $\sqrt{676}$ = ____ 32. $\sqrt[4]{1,296}$ = ____ 33. $\sqrt[3]{1,000}$ = ____ 34. $\sqrt{784}$ = ____ 35. $\sqrt{169}$ = ____

36. $\sqrt{841}$ = ____ 37. $\sqrt{196}$ = ____ 38. $\sqrt{225}$ = ____ 39. $\sqrt{289}$ = ____ 40. $\sqrt{361}$ = ____

41. $\sqrt{400}$ = ____ 42. $\sqrt{529}$ = ____ 43. $\sqrt{625}$ = ____ 44. $\sqrt{144}$ = ____ 45. $\sqrt{961}$ = ____

46. $\sqrt{576}$ = ____ 47. $\sqrt{256}$ = ____ 48. $\sqrt{121}$ = ____ 49. $\sqrt[4]{16}$ = ____ 50. $\sqrt[3]{27}$ = ____

Name _____ Class _____ Date _____

Practice 8-5 Exploring Square Roots

Find each of the following. Use mental math as much as possible.

1. 6^2 _____
2. 1^2 _____
3. $\sqrt{64}$ _____
4. 4^2 _____
5. $\sqrt{81}$ _____
6. 5^2 _____
7. $\sqrt{100}$ _____
8. 2^2 _____
9. $\sqrt{144}$ _____
10. 3^2 _____
11. 9^2 _____
12. $\sqrt{121}$ _____
13. $\sqrt{1}$ _____
14. $\sqrt{36}$ _____
15. 13^2 _____
16. 7^2 _____
17. 14^2 _____
18. $\sqrt{169}$ _____
19. 15^2 _____
20. $\sqrt{25}$ _____
21. 16^2 _____
22. 10^2 _____
23. $\sqrt{16}$ _____
24. $\sqrt{256}$ _____
25. $\sqrt{9}$ _____
26. 12^2 _____
27. $\sqrt{196}$ _____
28. 8^2 _____
29. $\sqrt{49}$ _____
30. $\sqrt{225}$ _____
31. 11^2 _____
32. $\sqrt{4}$ _____

Find the length of a side of a square with the given area.

33. 64 km^2 _____
34. 81 m^2 _____
35. 121 ft^2 _____
36. 4 mi^2 _____
37. 225 $in.^2$ _____
38. 196 yd^2 _____
39. 169 cm^2 _____
40. 144 mm^2 _____

Solve.

41. The square of a certain number is the same as three times the number. What is the number?

_____

42. The area of a square lawn is 196 yd^2. What is the perimeter of the lawn?

_____

Find two consecutive whole numbers that each square root is between.

43. $\sqrt{80}$ _____
44. $\sqrt{56}$ _____
45. $\sqrt{130}$ _____
46. $\sqrt{150}$ _____
47. $\sqrt{70}$ _____
48. $\sqrt{190}$ _____
49. $\sqrt{204}$ _____
50. $\sqrt{159}$ _____

Name: _____

Calculate the root of each value.

1. $\sqrt[4]{81}$ = ____ 2. $\sqrt[4]{625}$ = ____ 3. $\sqrt{36}$ = ____ 4. $\sqrt{25}$ = ____ 5. $\sqrt{49}$ = ____

6. $\sqrt[4]{16}$ = ____ 7. $\sqrt{1}$ = ____ 8. $\sqrt{4}$ = ____ 9. $\sqrt[3]{729}$ = ____ 10. $\sqrt[4]{256}$ = ____

11. $\sqrt{100}$ = ____ 12. $\sqrt[3]{125}$ = ____ 13. $\sqrt[4]{1}$ = ____ 14. $\sqrt[3]{1}$ = ____ 15. $\sqrt{441}$ = ____

16. $\sqrt{729}$ = ____ 17. $\sqrt{324}$ = ____ 18. $\sqrt{9}$ = ____ 19. $\sqrt[3]{216}$ = ____ 20. $\sqrt[3]{64}$ = ____

21. $\sqrt{81}$ = ____ 22. $\sqrt{64}$ = ____ 23. $\sqrt[3]{8}$ = ____ 24. $\sqrt[3]{343}$ = ____ 25. $\sqrt{900}$ = ____

26. $\sqrt[3]{512}$ = ____ 27. $\sqrt{1,024}$ = ____ 28. $\sqrt{16}$ = ____ 29. $\sqrt{484}$ = ____ 30. $\sqrt[3]{27}$ = ____

31. $\sqrt{676}$ = ____ 32. $\sqrt[4]{1,296}$ = ____ 33. $\sqrt[3]{1,000}$ = ____ 34. $\sqrt{784}$ = ____ 35. $\sqrt{169}$ = ____

36. $\sqrt{841}$ = ____ 37. $\sqrt{196}$ = ____ 38. $\sqrt{225}$ = ____ 39. $\sqrt{289}$ = ____ 40. $\sqrt{361}$ = ____

41. $\sqrt{400}$ = ____ 42. $\sqrt{529}$ = ____ 43. $\sqrt{625}$ = ____ 44. $\sqrt{144}$ = ____ 45. $\sqrt{961}$ = ____

46. $\sqrt{576}$ = ____ 47. $\sqrt{256}$ = ____ 48. $\sqrt{121}$ = ____ 49. $\sqrt[4]{16}$ = ____ 50. $\sqrt[3]{27}$ = ____

Name _____ Date _____ Class _____

LESSON 1-3

Practice C

Exponents

Write each expression in exponential form.

1. $10 \times 10 \times 10 \times 10$ _____

2. $7 \times 7 \times 7 \times 7 \times 7$ _____

3. $4 \times 4 \times 4$ _____

Find each value.

4. 8^2 _____

5. 4^3 _____

6. 6^3 _____

7. 15^2 _____

8. 2^8 _____

9. 3^5 _____

10. 38^1 _____

11. 7^3 _____

Compare. Write <, >, or =.

12. $8^2 \square 4^3$

13. $9^2 \square 5^2$

14. $6^2 \square 3^4$

15. $7^2 \square 2^4$

16. $10^2 \square 100^1$

17. $81^0 \square 9^2$

18. $4^2 + 5 \square 3^3 - 7$

19. $2^3 + 2 \square 3^2 - 2$

20. $2^5 - 10 \square 4^2 + 6$

21. If it takes Cell A 3 hours to produce two cells, how many cells will Cell A produce in 24 hours?

_____

22. Use exponents to complete the table.

Generation	Number of People	Exponent
Parents	2	2^1
Grandparents	4	2^2
Great Grandparents		
Great-Great Grandparents		
Great-Great-Great Grandparents		

Sixth Grade Vocabulary
SOL 6.22
Square Roots, Perfect Squares, Scientific Notation

1. **Perfect Square:** A number that has an integer as its square root.

Example:

16 is a perfect square.

2. **Power:** The value of a number represented by a base and an exponent.

Example:

$4^3 = 4 \times 4 \times 4 = 64$

3. **Scientific Notation:** A method of writing very large or very small numbers by using powers of 10.

Example:

$1{,}200{,}000 = 1.2 \times 10^6$

4. **Square:** A number multiplied by itself. A square can be expressed with the exponent 2.

Read 3^2 as "3 squared."

Examples:

$3^2 = 3 \times 3 = 9$ So, $3^2 = 9$.
$8^2 = 8 \times 8 = 64$ So, $8^2 = 64$.

5. **Square Root:** One of the two equal factors of a number; the symbol for square root is $\sqrt{\ }$.

Example:

$\sqrt{25} = 5$ because $5^2 = 5 \times 5 = 25$.

Examples

Here are the square roots of all the perfect squares from 1 to 100.

$\sqrt{1} = 1$ since $1^2 = 1$
$\sqrt{4} = 2$ since $2^2 = 4$
$\sqrt{9} = 3$ since $3^2 = 9$
$\sqrt{16} = 4$ since $4^2 = 16$
$\sqrt{25} = 5$ since $5^2 = 25$
$\sqrt{36} = 6$ since $6^2 = 36$
$\sqrt{49} = 7$ since $7^2 = 49$
$\sqrt{64} = 8$ since $8^2 = 64$
$\sqrt{81} = 9$ since $9^2 = 81$
$\sqrt{100} = 10$ since $10^2 = 100$

Finding square roots of of numbers that aren't perfect squares without a calculator

1. Estimate - first, get as close as you can by finding two perfect square roots your number is between.

2. Divide - divide your number by one of those square roots.

3. Average - take the average of the result of step 2 and the root.

4. Use the result of step 3 to repeat steps 2 and 3 until you have a number that is accurate enough for you.

Example: Calculate the square root of 10 ($\sqrt{10}$) to 2 decimal places.

1. Find the two perfect square numbers it lies between.

Solution:

$3^2 = 9$ and $4^2 = 16$, so $\sqrt{10}$ lies between 3 and 4.

2. Divide 10 by 3. 10/3 = 3.33 (you can round off your answer)

3. Average 3.33 and 3. (3.33 + 3)/2 = 3.1667

Repeat step 2: 10/3.1667 = 3.1579
Repeat step 3: Average 3.1579 and 3.1667. (3.1579 + 3.1667)/2 = 3.1623

Try the answer --> Is 3.1623 squared equal to 10? 3.1623 x 3.1623 = 10.0001

If this is accurate enough for you, you can stop! Otherwise, you can repeat steps 2 and 3.

Note: There are a number of ways to calculate square roots without a calculator. This is only one of them.

Name _____ Date _____ Class _____

LESSON 1-3

Reading Strategies

Synthesize Information

Exponents are an efficient way to write repeated multiplication.

Read 2^4 → *2 to the fourth power*

2^4 means **2 is a factor 4 times,** or $2 \times 2 \times 2 \times 2$

Read $2^4 = 16$ → *2 to the fourth power equals 16.*

Exponent	Meaning	Value
10^3 *10 to the third power*	10 is a factor 3 times: $10 \times 10 \times 10$	$10^3 = 1{,}000$
6^5 *6 to the fifth power*	6 is a factor 5 times: $6 \times 6 \times 6 \times 6 \times 6$	$6^5 = 7{,}776$

Answer each question.

1. Write in words how you would read 3^4. _____
2. What does 3^4 mean? _____
3. What is the value of 3^4? _____
4. Write in words how you would read 5^3. _____
5. Write 5^3 as repeated multiplication. _____
6. What is the value of 5^3? _____
7. Tell why 2^3 is not 2 x 3.

   _____

8. Is 3^4 the same as 4^3? _____ Explain why or why not.

   _____

Name _____ Date _____ Class _____

CHAPTER 1-3

Reteach

Exponents

You can write a number in exponential form to show repeated multiplication. A number written in exponential form has a base and an exponent. An exponent tells you how many times a number, called the base, is used as a factor.

8^4 ← exponent

↑

base

Write the expression in exponential form.

$6 \times 6 \times 6$

6 is used as a factor 3 times.

$6 \times 6 \times 6 = 6^3$

Write each expression in exponential form.

1. $8 \times 8 \times 8 \times 8 \times 8$ _____

2. 3×3 _____

3. $5 \times 5 \times 5 \times 5$ _____

4. $7 \times 7 \times 7$ _____

You can find the value of expressions in exponential form.

Find the value.

2^5

Step 1: Write the expression as repeated multiplication.

$2^5 = 2 \times 2 \times 2 \times 2 \times 2$

Step 2: Multiply.

$2 \times 2 \times 2 \times 2 \times 2 = 32$

$2^5 = 32$

Find each value.

5. 12^3 _____

6. 6^5 _____

7. 10^4 _____

8. 4^6 _____

Name _____ Date _____ Class _____

LESSON 1-3

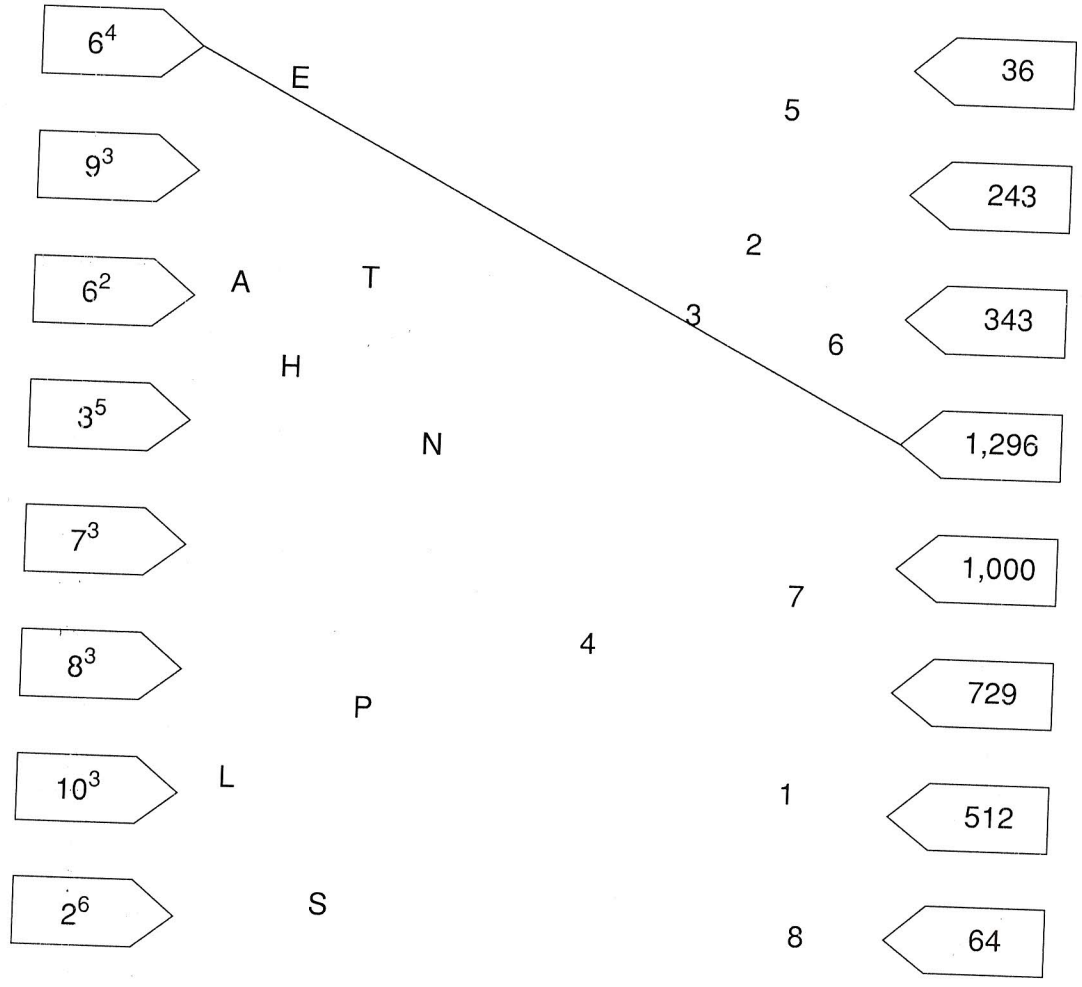
Puzzles, Twisters & Teasers

Answer This!

What are the only land mammals that cannot jump?

To find the answer:

1. Use a ruler to match each number and its value. (Each line you draw will cross a number and a letter)
2. Write the letter under the matching number in the decoder.



DECODER

3	4	3	1	2	5	6	7	8
___	___	___	___	___	___	___	___	___

Name: _____

Provide the scientific notation for each value.

1. 184,118 = _____
2. 274,510 = _____
3. 5.89445×10^5 = _____
4. 4.08883×10^5 = _____
5. 9.95031×10^5 = _____
6. 8.19644×10^5 = _____
7. 759,442 = _____
8. 729,599 = _____
9. 6.22547×10^5 = _____
10. 2.7223×10^5 = _____
11. 182,611 = _____
12. 111,147 = _____
13. 273,279 = _____
14. 5.80851×10^5 = _____
15. 209,243 = _____
16. 538,419 = _____
17. 2.22581×10^5 = _____
18. 8.3378×10^5 = _____
19. 4.60329×10^5 = _____
20. 641,877 = _____
21. 232,195 = _____
22. 239,403 = _____
23. 842,560 = _____
24. 554,662 = _____
25. 510,692 = _____
26. 2.15219×10^5 = _____
27. 820,953 = _____
28. 9.28908×10^5 = _____
29. 447,011 = _____
30. 3.2811×10^5 = _____
31. 1.44956×10^5 = _____
32. 1.40367×10^5 = _____
33. 6.54502×10^5 = _____
34. 4.40639×10^5 = _____
35. 9.61803×10^5 = _____
36. 321,454 = _____
37. 176,357 = _____
38. 6.67946×10^5 = _____
39. 316,330 = _____
40. 6.67577×10^5 = _____
41. 9.00046×10^5 = _____
42. 787,698 = _____
43. 633,536 = _____
44. 7.90333×10^5 = _____
45. 961,327 = _____
46. 1.7109×10^5 = _____
47. 4.60172×10^5 = _____
48. 781,244 = _____
49. 7.81669×10^5 = _____
50. 6.52318×10^5 = _____

Name: _____

Convert the values.

1. 55^2 = _____ 2. 99^2 = _____ 3. 74^2 = _____ 4. 77^2 = _____ 5. 82^2 = _____

6. 80^2 = _____ 7. 14^2 = _____ 8. 40^2 = _____ 9. 6^2 = _____ 10. 58^2 = _____

11. 2^2 = _____ 12. 19^2 = _____ 13. 96^2 = _____ 14. 95^2 = _____ 15. 67^2 = _____

16. 59^2 = _____ 17. 76^2 = _____ 18. 49^2 = _____ 19. 25^2 = _____ 20. 79^2 = _____

21. 46^2 = _____ 22. 62^2 = _____ 23. 27^2 = _____ 24. 9^2 = _____ 25. 8^2 = _____

26. 88^2 = _____ 27. 51^2 = _____ 28. 34^2 = _____ 29. 94^2 = _____ 30. 61^2 = _____

31. 92^2 = _____ 32. 71^2 = _____ 33. 65^2 = _____ 34. 85^2 = _____ 35. 75^2 = _____

36. 39^2 = _____ 37. 11^2 = _____ 38. 54^2 = _____ 39. 53^2 = _____ 40. 84^2 = _____

41. 98^2 = _____ 42. 7^2 = _____ 43. 38^2 = _____ 44. 47^2 = _____ 45. 31^2 = _____

46. 73^2 = _____ 47. 1^2 = _____ 48. 52^2 = _____ 49. 68^2 = _____ 50. 4^2 = _____

Name _____ Date _____ Class _____

LESSON 3-4

Practice C

Scientific Notation

Find each product.

1. 1.67 x 1,000 _____

2. 93.6 x 100 _____

3. 3.55 x 10,000 _____

Write each number in scientific notation.

4. 6,389,000 _____

5. 105,200,000 _____

6. 152 million _____

Write each number in standard form.

7. $1.5089 \cdot 10^4$ _____

8. $2.516 \cdot 10^8$ _____

9. $1.7711 \cdot 10^7$ _____

10. $3.9604 \cdot 10^6$ _____

11. $0.284 \cdot 10^4$ _____

12. $0.0869 \cdot 10^2$ _____

Write each measurement using scientific notation.

13. 250 km = _____ m

14. 0.065 kg = _____ g

15. 89 L = _____ mL

16. 1,540 km = _____ cm

17. 0.73 m = _____ mm

18. 10,240 kg = _____ g

19. In a recent count, 147,171,000 people in the United States owned cars. In the same year, $4.268 \cdot 10^7$ people in Japan owned cars. In which country did more people own cars? How many more?

_____

_____

20. On average, about $1.1 \cdot 10^9$ passengers use the New York City subway system each year. About 1,170,000,000 passengers use the Paris subway each year. How many passengers use those two subways each year?

_____

_____

Name _____ Date _____ Class _____

LESSON 1-3

Practice C

Exponents

Write each expression in exponential form.

1. $10 \times 10 \times 10 \times 10$ _____

2. $7 \times 7 \times 7 \times 7 \times 7$ _____

3. $4 \times 4 \times 4$ _____

Find each value.

4. 8^2 _____

5. 4^3 _____

6. 6^3 _____

7. 15^2 _____

8. 2^8 _____

9. 3^5 _____

10. 38^1 _____

11. 7^3 _____

Compare. Write <, >, or =.

12. $8^2 \square 4^3$

13. $9^2 \square 5^2$

14. $6^2 \square 3^4$

15. $7^2 \square 2^4$

16. $10^2 \square 100^1$

17. $81^0 \square 9^2$

18. $4^2 + 5 \square 3^3 - 7$

19. $2^3 + 2 \square 3^2 - 2$

20. $2^5 - 10 \square 4^2 + 6$

21. If it takes Cell A 3 hours to produce two cells, how many cells will Cell A produce in 24 hours?

_____

22. Use exponents to complete the table.

Generation	Number of People	Exponent
Parents	2	2^1
Grandparents	4	2^2
Great Grandparents		
Great-Great Grandparents		
Great-Great-Great Grandparents		

Name _____ Date _____ Class _____

LESSON 3-4

Practice A

Scientific Notation

Find each product.

1. $267 \cdot 100$ _____

2. $38.1 \cdot 100$ _____

3. $1.92 \cdot 100$ _____

Circle the letter of the correct answer.

4. Which of the following shows 85,000 written in scientific notation?
   - **A** $8.5 \cdot 10^3$
   - **B** $8.5 \cdot 10^4$
   - **C** $8.5 \cdot 10^5$
   - **D** $8.5 \cdot 10^6$

5. Which of the following shows $3.67 \cdot 10^5$ written in standard form?
   - **F** 3,670
   - **G** 36,700
   - **H** 367,000
   - **J** 3,670,000

Fill in the blanks to make each equation true.

6. $1{,}200 = 1.2 \cdot 10^{\_\_}$ _____

7. $25{,}000 = 2.5 \cdot 10^{\_\_}$ _____

8. $580 = 5.8 \cdot 10^{\_\_}$ _____

9. $470{,}000 = \_\_\_\_ \cdot 10^5$ _____

10. $6{,}580 = \_\_\_\_ \cdot 10^3$ _____

11. $8{,}900{,}000 = \_\_\_\_ \cdot 10^6$ _____

Write each number in standard form.

12. $3.4 \cdot 10^2$ _____

13. $7.9 \cdot 10^4$ _____

14. $1.75 \cdot 10^3$ _____

15. $1.24 \cdot 10^5$ _____

16. $9.6 \cdot 10^5$ _____

17. $1.28 \cdot 10^6$ _____

18. African elephants are the largest land mammals. The average African elephant weighs 11,000 pounds. Write this weight in scientific notation.

_____

Name _____ Date _____ Class _____

LESSON 3-4

Practice B

Scientific Notation

Find each product.

1. $345 \cdot 100$ _____

2. $65.2 \cdot 100$ _____

3. $1.84 \cdot 1{,}000$ _____

Write each number in scientific notation.

4. 16,700 _____

5. 4,680 _____

6. 58,340,000 _____

Write each number in standard form.

7. $3.25 \cdot 10^4$ _____

8. $7.08 \cdot 10^6$ _____

9. $1.209 \cdot 10^7$ _____

10. $6.8 \cdot 10^8$ _____

11. $0.51 \cdot 10^5$ _____

12. $0.006 \cdot 10^3$ _____

Identify the answer choice that is *not* equal to the given number.

13. 356,000
   - **A** $300{,}000 + 56{,}000$
   - **B** $3.56 \cdot 10^5$
   - **C** $3.56 \cdot 10^4$

14. $1.28 \cdot 10^6$
   - **A** $100{,}000 + 28{,}000$
   - **B** 1,280,000
   - **C** $12.8 \cdot 10^5$

15. 1,659,000
   - **A** $1{,}600{,}000 + 59{,}000$
   - **B** $1.659 \cdot 10^6$
   - **C** $16.59 \cdot 10^6$

16. $0.074 \cdot 10^3$
   - **A** $70.0 + 4.0$
   - **B** $7.4 \cdot 10^5$
   - **C** $7.4 \cdot 10^1$

17. In 2000, the population of Pennsylvania was 12,281,054. Round this figure to the nearest hundred thousand. Then write that number in scientific notation.

_____

18. In 2000, the population of North Carolina was about $8.05 \cdot 10^6$, and the population of South Carolina was about $4.01 \cdot 10^6$. Write the combined populations of these two states in standard form.

_____

Name _____ Date _____ Class _____

LESSON 3-4

Reading Strategies

Use a Graphic Organizer

This chart helps you see the ways large numbers can be written.

Scientific Notation

- A number between 1 and 10 multiplied by a power of 10
  2.5×10^6
  7×10^5

Ways to Write Large Numbers

Standard Form

- All place values are shown.
  2,500,000
  700,000

Words and Symbols

- Use numbers and words.
  2 million, 500 thousand; 2.5 million
  700 thousand

Use the graphic organizer to answer Exercises 1–2.

1. Which way to write large numbers shows every place value?

_____

2. Which way to write large numbers uses a power of 10?

_____

Identify how each large number is written. Write "scientific notation," "standard form," or "words and symbols".

3. 8,296,000

_____

4. 3.6 million

_____

5. 2.9×10^5

_____

Name _____ Date _____ Class _____

LESSON 3-4

Reteach

Scientific Notation

Scientific notation expresses a large number as the product of a number between one and ten and a power of ten.

To write 3,400 in scientific notation, move the decimal point to the left until the number falls between 1 and 10.

$1 < 3 < 10$, so move the decimal point 3 places to the left.

$3{,}400 = 3.4 \cdot 10^3$ (3 2 1)

The number of times you move the decimal point left is the power of ten.

Express each number in scientific notation.

1. 175,000 _____

2. 298 _____

3. 5,764 _____

4. 83 _____

5. 40,300 _____

6. 2,000,000 _____

7. 51,010 _____

8. 190,025 _____

You can express numbers written in scientific notation in standard form.

The power of ten tells you how many places to move the decimal point to the right.

$3.2 \cdot 10^4 = 32{,}000$

To write $3.2 \cdot 10^4$ in standard form, move the decimal point 4 places to the right.

Write each number in standard form.

9. $5.62 \cdot 10^3$ _____

10. $7.238 \cdot 10^2$ _____

11. $9.9 \cdot 10^5$ _____

12. $6.53 \cdot 10^1$ _____

13. $5.36 \cdot 10^4$ _____

14. $2.4 \cdot 10^2$ _____

15. $4.35 \cdot 10^3$ _____

16. $8 \cdot 10^5$ _____

17. $1 \cdot 10^4$ _____

18. $2.03 \cdot 10^3$ _____

19. $1.12 \cdot 10^2$ _____

20. $3.002 \cdot 10^6$ _____

Name _____ Date _____ Class _____

LESSON 3-4

Reading Strategies

Use a Graphic Organizer

This chart helps you see the ways large numbers can be written.

Scientific Notation

- A number between 1 and 10 multiplied by a power of 10
  2.5×10^6
  7×10^5

Ways to Write Large Numbers

Standard Form

- All place values are shown.
  2,500,000
  700,000

Words and Symbols

- Use numbers and words.
  2 million, 500 thousand; 2.5 million
  700 thousand

Use the graphic organizer to answer Exercises 1–2.

1. Which way to write large numbers shows every place value?

_____

2. Which way to write large numbers uses a power of 10?

_____

Identify how each large number is written. Write "scientific notation," "standard form," or "words and symbols".

3. 8,296,000

_____

4. 3.6 million

_____

5. 2.9×10^5

_____

Name _____ Date _____ Class _____

LESSON 3-4

Reteach

Scientific Notation

Scientific notation expresses a large number as the product of a number between one and ten and a power of ten.

To write 3,400 in scientific notation, move the decimal point to the left until the number falls between 1 and 10.

$1 < 3 < 10$, so move the decimal point 3 places to the left.

$3{,}400 = 3.4 \cdot 10^3$ (3 2 1)

The number of times you move the decimal point left is the power of ten.

Express each number in scientific notation.

1. 175,000 _____

2. 298 _____

3. 5,764 _____

4. 83 _____

5. 40,300 _____

6. 2,000,000 _____

7. 51,010 _____

8. 190,025 _____

You can express numbers written in scientific notation in standard form.

The power of ten tells you how many places to move the decimal point to the right.

$3.2 \cdot 10^4 = 32{,}000$

To write $3.2 \cdot 10^4$ in standard form, move the decimal point 4 places to the right.

Write each number in standard form.

9. $5.62 \cdot 10^3$ _____

10. $7.238 \cdot 10^2$ _____

11. $9.9 \cdot 10^5$ _____

12. $6.53 \cdot 10^1$ _____

13. $5.36 \cdot 10^4$ _____

14. $2.4 \cdot 10^2$ _____

15. $4.35 \cdot 10^3$ _____

16. $8 \cdot 10^5$ _____

17. $1 \cdot 10^4$ _____

18. $2.03 \cdot 10^3$ _____

19. $1.12 \cdot 10^2$ _____

20. $3.002 \cdot 10^6$ _____

Name _____ Date _____ Class _____

LESSON 3-4

Practice A

Scientific Notation

Find each product.

1. $267 \cdot 100$ _____

2. $38.1 \cdot 100$ _____

3. $1.92 \cdot 100$ _____

Circle the letter of the correct answer.

4. Which of the following shows 85,000 written in scientific notation?
   - **A** $8.5 \cdot 10^3$
   - **B** $8.5 \cdot 10^4$
   - **C** $8.5 \cdot 10^5$
   - **D** $8.5 \cdot 10^6$

5. Which of the following shows $3.67 \cdot 10^5$ written in standard form?
   - **F** 3,670
   - **G** 36,700
   - **H** 367,000
   - **J** 3,670,000

Fill in the blanks to make each equation true.

6. $1{,}200 = 1.2 \cdot 10^{\_\_}$ _____

7. $25{,}000 = 2.5 \cdot 10^{\_\_}$ _____

8. $580 = 5.8 \cdot 10^{\_\_}$ _____

9. $470{,}000 = \_\_\_\_ \cdot 10^5$ _____

10. $6{,}580 = \_\_\_\_ \cdot 10^3$ _____

11. $8{,}900{,}000 = \_\_\_\_ \cdot 10^6$ _____

Write each number in standard form.

12. $3.4 \cdot 10^2$ _____

13. $7.9 \cdot 10^4$ _____

14. $1.75 \cdot 10^3$ _____

15. $1.24 \cdot 10^5$ _____

16. $9.6 \cdot 10^5$ _____

17. $1.28 \cdot 10^6$ _____

18. African elephants are the largest land mammals. The average African elephant weighs 11,000 pounds. Write this weight in scientific notation.

_____

Name _____ Date _____ Class _____

LESSON 3-4

Practice B

Scientific Notation

Find each product.

1. $345 \cdot 100$ _____

2. $65.2 \cdot 100$ _____

3. $1.84 \cdot 1{,}000$ _____

Write each number in scientific notation.

4. 16,700 _____

5. 4,680 _____

6. 58,340,000 _____

Write each number in standard form.

7. $3.25 \cdot 10^4$ _____

8. $7.08 \cdot 10^6$ _____

9. $1.209 \cdot 10^7$ _____

10. $6.8 \cdot 10^8$ _____

11. $0.51 \cdot 10^5$ _____

12. $0.006 \cdot 10^3$ _____

Identify the answer choice that is *not* equal to the given number.

13. 356,000
   - **A** $300{,}000 + 56{,}000$
   - **B** $3.56 \cdot 10^5$
   - **C** $3.56 \cdot 10^4$

14. $1.28 \cdot 10^6$
   - **A** $100{,}000 + 28{,}000$
   - **B** 1,280,000
   - **C** $12.8 \cdot 10^5$

15. 1,659,000
   - **A** $1{,}600{,}000 + 59{,}000$
   - **B** $1.659 \cdot 10^6$
   - **C** $16.59 \cdot 10^6$

16. $0.074 \cdot 10^3$
   - **A** $70.0 + 4.0$
   - **B** $7.4 \cdot 10^5$
   - **C** $7.4 \cdot 10^1$

17. In 2000, the population of Pennsylvania was 12,281,054. Round this figure to the nearest hundred thousand. Then write that number in scientific notation.

_____

18. In 2000, the population of North Carolina was about $8.05 \cdot 10^6$, and the population of South Carolina was about $4.01 \cdot 10^6$. Write the combined populations of these two states in standard form.

_____

Name _____ Date _____ Class _____

LESSON 1-3

Challenge

Exponent Riddle

What is the greatest number that can be written with two digits?

Find the value of each expression below. Then in the box at the bottom of the page, write each expression's letter in the blank above its value. When you have found all the values, you will have solved the riddle.

E 3^3 _____

H 5^2 _____

I 2^4 _____

N 34^0 _____

O 9^2 _____

P 4^3 _____

R 6^2 _____

T 7^2 _____

W 10^2 _____

?	?	?	?	?	?	?	?	?	?	?	?	?	?	?
?	___	___	___	___		___	___		___	___	___			?
	1	16	1	27		49	81		49	25	27			
?	___	___	___	___	___		___	___	___	___	___			?
	1	16	1	49	25		64	81	100	27	36			
?	?	?	?	?	?	?	?	?	?	?	?	?	?	?

Name _____ Date _____ Class _____

LESSON 1-3

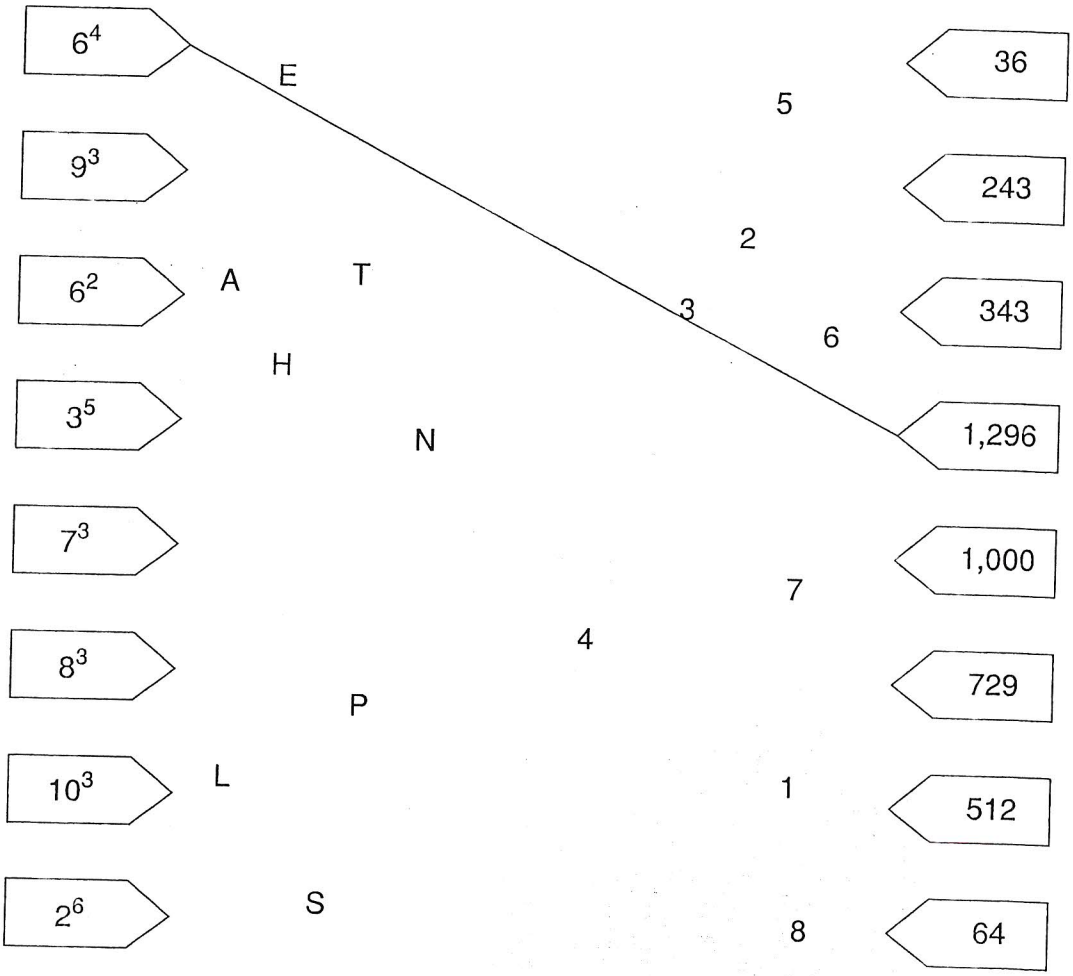
Puzzles, Twisters & Teasers

Answer This!

What are the only land mammals that cannot jump?

To find the answer:

1. Use a ruler to match each number and its value.
   (Each line you draw will cross a number and a letter)
2. Write the letter under the matching number in the decoder.



DECODER

3	4	3	1	2	5	6	7	8
_____	_____	_____	_____	_____	_____	_____	_____	_____

Square Roots	One of the two equal factors of a number.
Perfect Squares	A square of a whole number.
Exponents	The numbers that indicates how many times the base is used as a factor.
Exponential Form	A number is written with a base and an exponent.
Powers	A number produced by raising a base to an exponent.

Name _____

Division 5

Practice Worksheet

Divide the following numbers with your calculator:

Example: Divide 45 ÷ 9

Enter: 45 ÷ 9

4 5 ÷ 9 Enter

5

The answer is **5**

Divide the following numbers with your calculator:

1. 12 ÷ 3 = _____ **2.** 24 ÷ 8 = _____ **3.** 50 ÷ 5 = _____

4. 99 ÷ 11 = _____ **5.** 144 ÷ 12 = _____ **6.** 875 ÷ 25 = _____

Example: Divide 2000 ÷ 2 ÷ 2 ÷ 2 ÷ 2

Enter: 2 0 0 0 ÷ 2 Enter 1000

= Enter 500

= Enter 250

= Enter 125

7. Divide 1536 ÷ 4 ÷ 4 ÷ 4 ÷ 4

_____ _____ _____ _____

8. Camille had 96 cookies and wanted to share them with her 12 friends. If she gave herself and her friends the same number of cookies, how many cookies did Camille and each of her friends get?

_____

Name _____
Date _____
Class Period _____

Exponents Practice

Note: An exponent tells how many times the base number is used as a factor.
Example: Simplify $6^6 = 6 \times 6 \times 6 \times 6 \times 6 \times 6 = 46{,}656$

1. $5^2 =$

2. $2^6 =$

3. $4^4 =$

4. $6^2 =$

5. $7^5 =$

6. $8^5 =$

7. $3^0 =$

8. $1^8 =$

Name _____
Date _____
Class Period _____

Exponents Practice

Note: An exponent tells how many times the base number is used as a factor.
Example: Simplify $6^6 = 6 \times 6 \times 6 \times 6 \times 6 \times 6 = 46{,}656$

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6. $8^5 =$

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Name _____

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Example: Divide 2000 ÷ 2 ÷ 2 ÷ 2 ÷ 2

Enter:

1000

=

500

=

250

=

125

7. Divide 1536 ÷ 4 ÷ 4 ÷ 4 ÷ 4

_____ _____ _____ _____

8. Camille had 96 cookies and wanted to share them with her 12 friends. If she gave herself and her friends the same number of cookies, how many cookies did Camille and each of her friends get?

_____

Name _____ Date _____ Class _____

LESSON 1-3

Practice B

Exponents

Write each expression in exponential form.

1. 9×9 _____

2. $7 \times 7 \times 7$ _____

3. $1 \times 1 \times 1 \times 1 \times 1$ _____

4. $5 \times 5 \times 5 \times 5$ _____

5. $2 \times 2 \times 2 \times 2 \times 2 \times 2$ _____

6. $10 \times 10 \times 10 \times 10$ _____

Find each value.

7. 6^2 _____

8. 5^3 _____

9. 10^3 _____

10. 7^2 _____

11. 2^5 _____

12. 3^4 _____

13. 25^1 _____

14. 16^0 _____

Compare. Write <, >, or =.

15. $8^0 \square 7^1$

16. $10^2 \square 11^2$

17. $8^2 \square 4^3$

18. $3^4 \square 5^2$

19. $2^5 \square 9^2$

20. $6^2 \square 3^3$

21. What whole number equals 25 when it is squared and 125 when it is cubed?

_____

22. Use exponents to write the number 81 three different ways.

_____

Name _____ Date _____ Class _____

LESSON 1-3

Practice C

Exponents

Write each expression in exponential form.

1. $10 \times 10 \times 10 \times 10$ _____

2. $7 \times 7 \times 7 \times 7 \times 7$ _____

3. $4 \times 4 \times 4$ _____

Find each value.

4. 8^2 _____

5. 4^3 _____

6. 6^3 _____

7. 15^2 _____

8. 2^8 _____

9. 3^5 _____

10. 38^1 _____

11. 7^3 _____

Compare. Write <, >, or =.

12. $8^2 \square 4^3$

13. $9^2 \square 5^2$

14. $6^2 \square 3^4$

15. $7^2 \square 2^4$

16. $10^2 \square 100^1$

17. $81^0 \square 9^2$

18. $4^2 + 5 \square 3^3 - 7$

19. $2^3 + 2 \square 3^2 - 2$

20. $2^5 - 10 \square 4^2 + 6$

21. If it takes Cell A 3 hours to produce two cells, how many cells will Cell A produce in 24 hours?

_____

22. Use exponents to complete the table.

Generation	Number of People	Exponent
Parents	2	2^1
Grandparents	4	2^2
Great Grandparents		
Great-Great Grandparents		
Great-Great-Great Grandparents		

Name _____ Date _____ Class _____

LESSON 1-3

Practice

Exponents

Write each expression in exponential form.

1. 9×9

_____

2. $7 \times 7 \times 7$

_____

3. $1 \times 1 \times 1 \times 1 \times 1$

_____

4. $5 \times 5 \times 5 \times 5$

_____

5. $2 \times 2 \times 2 \times 2 \times 2 \times 2$

_____

6. $10 \times 10 \times 10 \times 10$

_____

Find each value.

7. 6^2

_____

8. 5^3

_____

9. 10^3

_____

10. 7^2

_____

11. 2^5

_____

12. 3^4

_____

13. 25^1

_____

14. 16^0

_____

Compare. Write <, >, or =.

15. $8^0 \square 7^1$

16. $10^2 \square 11^2$

17. $8^2 \square 4^3$

18. $3^4 \square 5^2$

19. $2^5 \square 9^2$

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