

PART I GET STARTED

Today's Mathematics

We will write repeated factors as powers, interpret the base and exponent, evaluate powers, and recognize perfect squares.

Essential Question

How can you use repeated factors in real-life situations?

DO NOW

Review Section 1.1. Find each value and estimate one answer to check it.

1. $4,305 + 2,798$

2. $9,000 - 4,637$

3. $36 \cdot 24$

4. $864 \div 27$

SEE IT

A square patio has 6 tiles in each row and 6 tiles in each column.

1. Write a multiplication expression for the total number of tiles.
2. How could you write the repeated factor using an exponent?
3. In your power, what does the base describe? What does the exponent describe?

QUICK WRITE | 2 MINUTES

Explain the difference between the base and exponent in 3^5 .

PART II INVESTIGATE**FROM REPEATED FACTORS TO POWERS**

Complete each row. Use the table to organize what the base and exponent tell you.

Repeated factors	Power	Base / exponent meaning	Value
$4 \cdot 4$			
$6 \cdot 6$			
$10 \cdot 10 \cdot 10$			
$3 \cdot 3 \cdot 3 \cdot 3$			
$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$			

LOOK FOR A PATTERN

Which values in the table are perfect squares? Explain what makes each one a perfect square.

PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

1. The base is the repeated factor. 2. The exponent tells how many times the base is used as a factor. 3. A perfect square is the square of a whole number.

WORKED MODEL

$5 \cdot 5 \cdot 5 \cdot 5 = 5^4 = 625$. The base is 5, and the exponent 4 counts the four factors of 5.

FOCUSED PRACTICE

Show a clear strategy and enough work that another student could follow your reasoning.

1. Write $3 \cdot 3 \cdot 3 \cdot 3$ as a power and evaluate it.
2. Is 64 a perfect square? Write a power that justifies your answer.

CHALLENGE

Create a new problem that uses today's idea and has a whole-number answer. Trade with a partner and solve.

MATH WRITE | 5 MINUTES

Explain how repeated multiplication, exponent notation, and the value of a power are connected.

PART IV PUZZLE PRACTICE

Homework

Name _____ Date _____

DID YOU HEAR ABOUT ...

Complete each exercise. Find the answer in the answer bank. Write its word in the box with the exercise letter.

WRITE THE PRODUCT AS A POWER

A. $8 \cdot 8$

B. $12 \cdot 12$

C. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

D. $9 \cdot 9 \cdot 9 \cdot 9$

E. $5 \cdot 5 \cdot 5$

F. $4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$

G. $11 \cdot 11 \cdot 11 \cdot 11 \cdot 11$

H. $7 \cdot 7 \cdot 7$

FIND THE VALUE

I. 2^4

J. 3^3

K. 4^3

L. 10^4

M. 6^2

N. 5^2

PERFECT SQUARES

O. Is 12 a perfect square?

P. Is 144 a perfect square?

Q. A square chair arrangement uses 225 chairs. How many chairs are in each row?

8^2 / THE	12^2 / BASEBALL	3^5 / PLAYER	9^4 / WHO
5^3 / CREATED	4^6 / A	11^5 / WEB	7^3 / SITE
16 / BECAUSE	27 / HE	64 / WANTED	10,000 / TO
36 / GET	25 / A	No / LOT	Yes / OF
15 / HITS	46 / CATCHER	56 / INNING	71 / SURF

A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	