LESSON MAKER PRO

Square Power Patterns

Use exponents, squares, and place-value patterns.

GRADE 6 · 6.NS.3

6.NS.3 "The student will recognize and represent patterns with whole number exponents and perfect squares. Recognize and represent patterns with bases and exponents that are whole numbers..."

NAME _____ DATE _____

POWERS AND SQUARES

A base tells which factor repeats, and an exponent tells how many times it repeats. A perfect square is made by multiplying a whole number by itself, and each higher power of 10 has one more zero.

WORKED EXAMPLE

Find 9^2.

1. The base is 9 and the exponent is 2.
2. Write 9^2 = 9 x 9.
3. Multiply: 9 x 9 = 81.

Answer: 9^2 = 81

PRACTICE 6 problems

1 Write 4^3 as repeated multiplication. Then find its value.

ANSWER _____

2 Find 7^2.

ANSWER _____

3 Which number is a perfect square, 150 or 169? Write it as a square.

ANSWER _____

4 Is 200 a perfect square? Use nearby perfect squares to justify your answer.

ANSWER _____

5 Complete the pattern: 10^1 = 10, 10^2 = 100, 10^3 = ___, 10^4 = ___.

ANSWER _____

6 A square array has 361 tiles. How many tiles are in each side of the array?

ANSWER _____

APPLY IT Show your work

1 Maya makes a pixel-art poster with 256 square stickers. She wants to place them in a square grid with the same number of stickers in every row and column. Can she do this? If so, how many stickers will be in each row?

WORK SPACE

ANSWER _____

2 A science club sensor records 10^4 data points during a test. Write the number of data points in standard form. How many zeros are in the number?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Without a calculator, decide whether 300 is a perfect square. Explain your reasoning by using two nearby perfect squares.

_____

_____

ANSWER KEY

Square Power Patterns

GRADE 6 · 6.NS.3

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write 4^3 as repeated multiplication. Then find its value.	**4 x 4 x 4 = 64**
2	Find 7^2.	**49**
3	Which number is a perfect square, 150 or 169? Write it as a square.	**169; 13^2 = 169**
4	Is 200 a perfect square? Use nearby perfect squares to justify your answer.	**No; 14^2 = 196 and 15^2 = 225, so 200 is not a perfect square.**
5	Complete the pattern: 10^1 = 10, 10^2 = 100, 10^3 = ___, 10^4 = ___.	**10^3 = 1,000; 10^4 = 10,000**
6	A square array has 361 tiles. How many tiles are in each side of the array?	**19 tiles**

PART 2 · APPLY IT

1. **Yes, 16 stickers in each row.** Since 16 x 16 = 256, 256 is a perfect square. The grid can have 16 rows and 16 columns.
2. **10,000 data points; 4 zeros.** The exponent 4 means the power of 10 has four zeros. Therefore, 10^4 = 10,000.

CHALLENGE

No. 17^2 = 289 and 18^2 = 324. Since 300 is between 289 and 324, it is not a perfect square.

Accept equivalent repeated-multiplication forms using x or parentheses. For perfect-square justifications, accept any correct nearby whole-number squares that show the number lies between consecutive perfect squares.