LESSON MAKER PRO

Square Spotters

Find square patterns with equal rows and columns.

GRADE 6 · 6.NS.3.b

6.NS.3.b "Recognize and represent patterns of perfect squares not to exceed 202, by using concrete and pictorial models."

NAME _____ DATE _____

SQUARE ARRAYS

A perfect square is the total number of dots in an array with the same number of rows and columns. To check a number, find whether it can make equal rows and columns. As the side length grows by 1, the new square gains the next odd number of dots.

WORKED EXAMPLE

Represent 144 dots as a square array. What is the side length?

1. Find equal factors of 144: 12 x 12 = 144.
2. The array has 12 rows.
3. Each row has 12 dots.
4. The side length is 12 dots.

Answer: 144 = 12 x 12, so the square array has a side length of 12.

PRACTICE 6 problems

1 A square tile design has 36 tiles. Write the equal-row multiplication sentence.

ANSWER _____

2 Which number is a perfect square: 48, 49, or 50? Show its equal factors.

ANSWER _____

3 A dot array has 5 equal rows with 5 dots in each row. How many dots are in the array?

ANSWER _____

4 An 8-by-8 pixel icon is a square array. How many pixels does it have?

ANSWER _____

5 A 64-dot square array grows to the next larger square array. How many dots are added?

ANSWER _____

6 Which side lengths make square arrays with no more than 202 dots: 13, 14, or 15? Write each matching total.

ANSWER _____

APPLY IT Show your work

1 A game club is making a square LED badge with 13 lights in each row and 13 equal rows. How many lights will the badge use?

WORK SPACE

ANSWER _____

2 For a school art show, Maya designs a square mosaic with 14 tiles along each side. The mosaic must use no more than 202 tiles. How many tiles does she use, and does it meet the limit?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A square array has more than 150 dots but no more than 202 dots. Its side length is an odd whole number. What is the total number of dots? Explain your reasoning.

_____

_____

ANSWER KEY

Square Spotters

GRADE 6 · 6.NS.3.b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A square tile design has 36 tiles. Write the equal-row multiplication sentence.	**6 x 6 = 36**
2	Which number is a perfect square: 48, 49, or 50? Show its equal factors.	**49, because 7 x 7 = 49**
3	A dot array has 5 equal rows with 5 dots in each row. How many dots are in the array?	**25**
4	An 8-by-8 pixel icon is a square array. How many pixels does it have?	**64**
5	A 64-dot square array grows to the next larger square array. How many dots are added?	**17 dots**
6	Which side lengths make square arrays with no more than 202 dots: 13, 14, or 15? Write each matching total.	**13 and 14. 13 x 13 = 169 and 14 x 14 = 196.**

PART 2 · APPLY IT

1. **169 lights** Multiply the equal side lengths: 13 x 13 = 169. The badge is a 13-by-13 square array.
2. **196 tiles, yes** Multiply 14 x 14 = 196. Since 196 is less than 202, the mosaic meets the limit.

CHALLENGE

169 dots. The square totals in this range are 169 and 196. Only 169 has an odd side length because 13 x 13 = 169.

Accept multiplication written with x or repeated equal rows and columns. For the challenge, accept any clear reasoning that identifies 13 x 13 = 169 and rejects 14 x 14 = 196 because 14 is even.