LESSON MAKER PRO

Square Number Detectives

Use arrays and nearby square products to test numbers from 0 to 400.

GRADE 6 · 6.NS.3.c

6.NS.3.c "Justify if a number between 0 and 400 is a perfect square through modeling or mathematical reasoning."

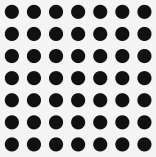
NAME _____ DATE _____

SPOTTING PERFECT SQUARES

A perfect square is the product of a whole number multiplied by itself. You can model it as a square array with the same number of rows and columns, or compare it to nearby square products.

WORKED EXAMPLE

Look at the square array. Is the total number of dots a perfect square?



1. Count 7 rows with 7 dots in each row.
2. Multiply 7 × 7 = 49.
3. Because 49 = 7 × 7, it forms a square array.

Answer: Yes. 49 is a perfect square.

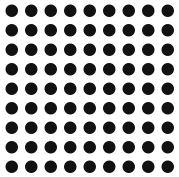
PRACTICE 6 problems

1 Look at the array. Write the total number of dots. Then tell whether the total is a perfect square.



ANSWER _____

2 Look at the array. Is the total number of dots a perfect square? Explain with a multiplication fact.



ANSWER _____

3 Is 144 a perfect square? Justify your answer with a multiplication fact.

ANSWER _____

4 Is 150 a perfect square? Use nearby square products to justify your answer.

ANSWER _____

5 Is 225 a perfect square? Justify your answer with a multiplication fact.

ANSWER _____

6 Is 398 a perfect square? Use nearby square products to justify your answer.

ANSWER _____

APPLY IT Show your work

1 A game design club has 196 small tiles for a pixel-art display. They want to place all the tiles in a square with the same number of tiles in every row and column. Can they do this? Show the multiplication fact that proves your answer.

WORK SPACE

ANSWER _____

2 A school music festival has 324 glow bracelets. The organizers want to arrange every bracelet in a square display with an equal number in each row and column. Is this possible? Explain.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Without multiplying every pair of whole numbers, decide whether 288 is a perfect square. Use two consecutive square products to prove your answer.

WORK SPACE AND ANSWER

ANSWER KEY

Square Number Detectives

GRADE 6 · 6.NS.3.c

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Look at the array. Write the total number of dots. Then tell whether the total is a perfect square.	**36; yes, 36 is a perfect square because 6 × 6 = 36.**
2	Look at the array. Is the total number of dots a perfect square? Explain with a multiplication fact.	**Yes. 81 is a perfect square because 9 × 9 = 81.**
3	Is 144 a perfect square? Justify your answer with a multiplication fact.	**Yes. 144 is a perfect square because 12 × 12 = 144.**
4	Is 150 a perfect square? Use nearby square products to justify your answer.	**No. 12 × 12 = 144 and 13 × 13 = 169, so 150 is between consecutive perfect squares.**
5	Is 225 a perfect square? Justify your answer with a multiplication fact.	**Yes. 225 is a perfect square because 15 × 15 = 225.**
6	Is 398 a perfect square? Use nearby square products to justify your answer.	**No. 19 × 19 = 361 and 20 × 20 = 400, so 398 is between consecutive perfect squares.**

PART 2 · APPLY IT

1. **Yes. They can make a 14 by 14 square because 14 × 14 = 196.** Test whether 196 is a product of the same whole number twice. Since 14 × 14 = 196, the tiles can form a square array.
2. **Yes. They can make an 18 by 18 square because 18 × 18 = 324.** Check for a whole number multiplied by itself that equals 324. Since 18 × 18 = 324, the display can be square.

CHALLENGE

No. 16 × 16 = 256 and 17 × 17 = 289. Since 288 is between 256 and 289, it is not a perfect square.

Accept any correct multiplication fact or nearby consecutive square products as justification. Students may describe a square array with equal rows and columns instead of writing the multiplication sentence.