

Square Number Detectives

Use multiplication facts to spot perfect squares.

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 _____

THE BIG IDEA

A perfect square is a number made by multiplying a whole number by itself. To test a number, find a whole number that can be multiplied by itself to make the number. If the number falls between two consecutive square products, it is not a perfect square.

WORKED EXAMPLE

Is 121 a perfect square?

1. Look for a whole number multiplied by itself.
2. $11 \times 11 = 121$.
3. 121 matches 11×11 , so it is a perfect square.

Answer: Yes, 121 is a perfect square.

PRACTICE 6 problems

- 1** Is 0 a perfect square? Justify your answer with multiplication.

ANSWER _____

- 2** Is 49 a perfect square? Justify your answer with multiplication.

ANSWER _____

- 3** Is 130 a perfect square? Use nearby square products to justify your answer.

ANSWER _____

- 4** Is 144 a perfect square? Justify your answer with multiplication.

ANSWER _____

- 5** Is 275 a perfect square? Use nearby square products to justify your answer.

ANSWER _____

- 6** Is 400 a perfect square? Justify your answer with multiplication.

ANSWER _____

APPLY IT Show your work

- 1** A robotics club has 256 LED lights. They want to place all the lights in a square display with the same number of rows and lights in each row. Can they do this? Justify your answer.

WORK SPACE

ANSWER _____

- 2** An art club has 180 square stickers. They want to cover a square poster with the same number of stickers in each row and column, using every sticker. Can they do this? Justify your answer.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Without listing every perfect square from 1 to 400, decide whether 278 is a perfect square. Explain how you know.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Is 0 a perfect square? Justify your answer with multiplication.	Yes. $0 \times 0 = 0$.
2	Is 49 a perfect square? Justify your answer with multiplication.	Yes. $7 \times 7 = 49$.
3	Is 130 a perfect square? Use nearby square products to justify your answer.	No. $11 \times 11 = 121$ and $12 \times 12 = 144$, so 130 is between two perfect squares.
4	Is 144 a perfect square? Justify your answer with multiplication.	Yes. $12 \times 12 = 144$.
5	Is 275 a perfect square? Use nearby square products to justify your answer.	No. $16 \times 16 = 256$ and $17 \times 17 = 289$, so 275 is between two perfect squares.
6	Is 400 a perfect square? Justify your answer with multiplication.	Yes. $20 \times 20 = 400$.

PART 2 • APPLY IT

- Yes. 256 is a perfect square because $16 \times 16 = 256$.** A square display needs equal rows and columns. Since 16 rows of 16 lights makes 256 lights, the club can make the display.
- No. 180 is not a perfect square because $13 \times 13 = 169$ and $14 \times 14 = 196$.** 180 falls between 169 and 196, two consecutive perfect squares. No whole number multiplied by itself equals 180.

CHALLENGE

278 is not a perfect square. $16 \times 16 = 256$ and $17 \times 17 = 289$, and 278 is between 256 and 289.

Accept any correct multiplication model or comparison to consecutive perfect squares. For non-perfect squares, students should show nearby square products that place the number between them.