MATHEMATICS · GRADES 7-9

Square numbers and square roots

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you move between the side of a square and its area, like working out the side of a square garden from how much ground it covers, or the area from its side. Squaring turns a side into an area, and taking a square root turns an area back into a side. Knowing both directions means you can start from whichever measurement you have and find the other. That is how you plan a patio, a garden bed, or a tiled floor, where the side and the area both matter.



Rule

Square numbers and square roots: squaring a number means multiplying it by itself, and a square root undoes squaring.

The square root of a number is the number that multiplied by itself gives that number.

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Worked examples

EXAMPLE 1

Q Find the square root of 49.

SOLUTION

This is a square-root question, so ask which number times itself makes 49.

Seven times 7 is 49, so 7 is the number whose square is 49.

So the square root of 49 is 7.

EXAMPLE 2

Q Is 55 a perfect square? How can you tell without working it out?

SOLUTION

This is an is-it-a-perfect-square question, so the one rule to remember is that a perfect square has a whole number as its square root, and the squares go in a fixed order: 49, 64, 81.

Seven squared is 49 and 8 squared is 64. Fifty-five sits between 49 and 64, and there is no whole number between 7 and 8.

So 55 is not a perfect square, because no whole number squared gives 55.

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Practice questions

1 Work out 7^2

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2 Work out $9^2 + 4^2$.

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3 Find the square root of 81

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4 **Which is bigger: the square root of 64 or the square root of 100?**

- **A** The square root of 64
- **B** The square root of 100
- **C** They are equal
- **D** Cannot tell

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5 **A square garden has an area of 64 square metres. What is the length of one side?**

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6 A square tile has a side of 5 cm. What is its area?

- **A** 10 square cm
- **B** 25 square cm
- **C** 20 square cm
- **D** 15 square cm

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7 Which of these is a perfect square: 90 or 121?

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8 How many square numbers are there between 81 and 225?

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9 **Work out the square root of 81 plus the square root of 25.**

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10 **A square photo has an area of 36 square cm. What is its perimeter, in cm?**

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ANSWER KEY

1. 49

2. 97

3. 9

4. The square root of 100

5. 8

6. 25 square cm

7. 121

8. 5

9. 14

10. 24

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