MATHEMATICS · GRADES 7-9

Square roots

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you undo a squaring, like finding the side of a square patio from its area or the length of a diagonal across a square room. When you know a number was made by multiplying something by itself, the square root tells you what that something was. It is the reverse of squaring, and it comes up whenever an area or a squared distance is all you have to start from. That is how you turn a floor area into a side length, or a squared measurement back into the length it came from.



Rule

Square roots: 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 144.

SOLUTION

This is a square-root question, so ask which number times itself makes 144.

Twelve times 12 is 144, so 12 is the number whose square is 144.

So the square root of 144 is 12.

EXAMPLE 2

Q Find the square root of 2, to 2 decimal places.

SOLUTION

This is an estimating question, because 2 is not a perfect square, so its square root is not a whole number. The one rule to remember is to bracket it between two whole numbers, then test.

One squared is 1 and 2 squared is 4, so the square root of 2 is between 1 and 2. Try 1.41: 1.41 times 1.41 is 1.9881, which is close to 2 but a little under. Try 1.42: 1.42 times 1.42 is 2.0164, which is a little over.

So the square root of 2 is about 1.41 to 2 decimal places, because 1.41 squared is closer to 2 than 1.42 squared.

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Practice questions

1. A square tile has area 36 cm². What is the length of one side?

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2. A square garden covers 121 square metres. What is the length of one side?

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3. A square has side 8 cm. What is its area?

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4 The square root of a number is 9. What is the number?

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5 A square has an area of 3 square metres. What is its side length, to 2 decimal places?

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6 Estimate the square root of 40 to the nearest whole number.

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7 Find the square root of 0.09

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8 Between which two whole numbers does the square root of 50 lie?

A 6 and 7

B 8 and 9

C 7 and 8

D 5 and 6

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9 Find the square root of $\frac{16}{49}$

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10 **A square has an area of 50 square metres. Is its side length a whole number?**

A Yes

B No

C Yes, because 50 is even

D Yes, because 50 ends in 0

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ANSWER KEY

1. 6

2. 11

3. 64

4. 81

5. 1.73

6. 6

7. 0.3

8. 7 and 8

9. $\frac{4}{7}$

10. No

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