MATHEMATICS · GRADES 7-9

Perfect squares and perfect cubes

Difficulty level: Intermediate

Mathematics: Grades 7-9

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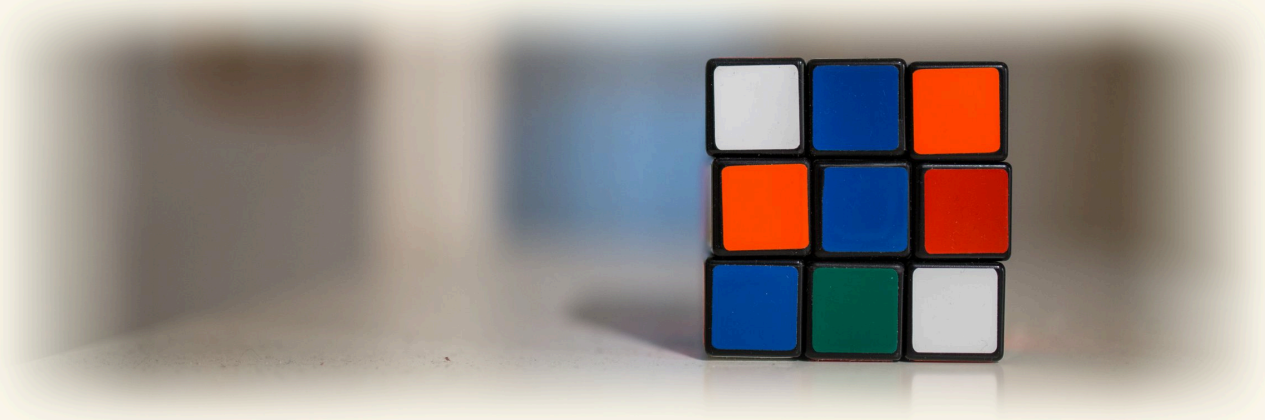
Overview of the concept

This is how you spot at a glance the numbers that make square floor tiles or cube-shaped boxes, so you can work out their side lengths in your head. A tiler who knows 144 is a perfect square knows right away that a 144 tile floor can be a 12 by 12 square. A packer who knows 64 is a perfect cube knows a box of 64 small cubes can be 4 on each side. Recognizing these numbers saves measuring and guessing, and it is the first step to working with square roots and cube roots.



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Rule

A perfect square is a number you get by multiplying the same whole number by itself. Its square root is a whole number.

A perfect cube is a number you get by multiplying the same whole number by itself three times. Its cube root is a whole number; if you get a decimal, it is not a perfect cube.

Perfect squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

Perfect cubes: 1, 8, 27, 64, 125, 216, 343, 512, 729, 1000

Worked examples

EXAMPLE 1

Q **Is 144 a perfect square, a perfect cube, both, or neither?**

SOLUTION

12 × 12 = 144, so 144 is a perfect square.

The cube root of 144 comes out as a decimal, so 144 is not a perfect cube.

So 144 is a perfect square only.

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EXAMPLE 2

Q Is 64 a perfect square, a perfect cube, both, or neither?

SOLUTION

8 × 8 = 64, so 64 is a perfect square.

4 × 4 × 4 = 64, so 64 is a perfect cube.

So 64 is both a perfect square and a perfect cube.

Practice questions

1 A square floor is tiled with 25 tiles. Is 25 a perfect square? Answer yes or no.

A Yes

B No

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2 Could 25 be the cube of a whole number? Answer yes or no.

A Yes

B No

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3 A square garden needs 27 tiles. Is 27 a perfect square? Answer yes or no.

A Yes

B No

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4 Can 27 small cubes be stacked into one bigger cube? Answer yes or no.

A Yes

B No

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5 A dance floor has 36 square tiles. Is 36 a perfect square? Answer yes or no.

- A Yes
- B No

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6 A box holds 1000 small cubes. Can they form one bigger cube? Answer yes or no.

- A Yes
- B No

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7 Is 1 both a perfect square and a perfect cube? Answer yes or no.

- A Yes
- B No

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8 A hundred square tiles are laid out. Can they form a square? Answer yes or no.

- A Yes
- B No

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9 Could 125 be the cube of a whole number? Answer yes or no.

- A Yes
- B No

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10 A square patio needs 50 tiles. Is 50 a perfect square? Answer yes or no.

- A Yes
- B No

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ANSWER KEY

1. Yes

2. No

3. No

4. Yes

5. Yes

6. Yes

7. Yes

8. Yes

9. Yes

10. No

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