

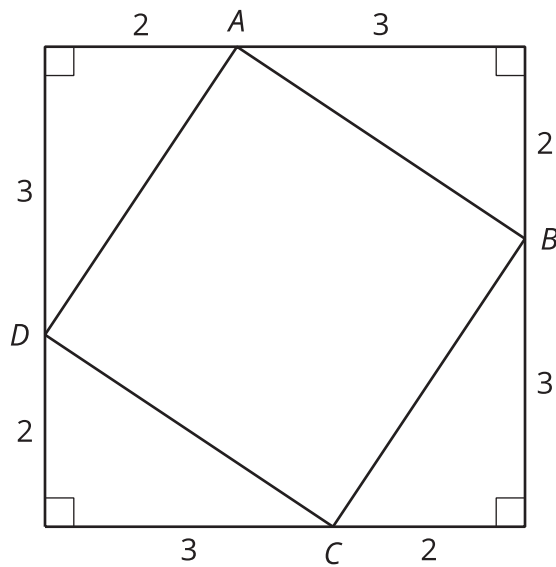


# Square Roots and Cube Roots

Let's think about square and cube roots.

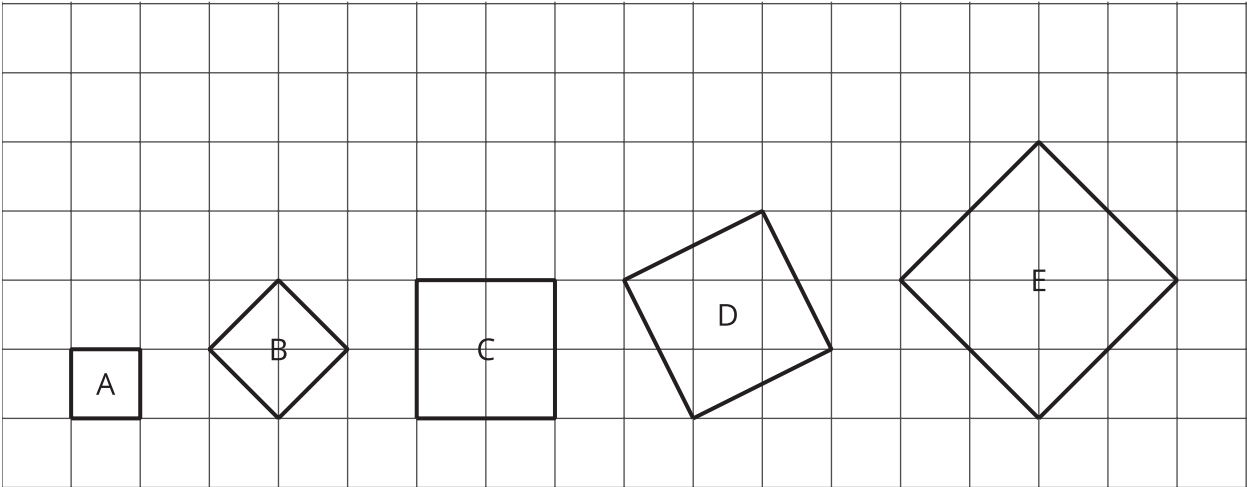
## 2.1 It's a Square

Find the area of square  $ABCD$ .



2.2

Squares and Their Side Lengths



1. Complete the table. Give the area of each square in square units, and give its exact side length in units.

| figure      | A | B | C | D | E |
|-------------|---|---|---|---|---|
| area        | 1 |   |   |   |   |
| side length | 1 |   |   |   |   |

2. This table includes areas in square units and side lengths in units of some more squares. Complete the table.

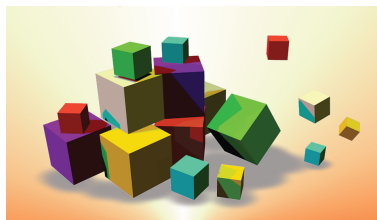
| area        | 9 |   | 23 |     | 89 |
|-------------|---|---|----|-----|----|
| side length |   | 4 |    | 6.4 |    |

## Are you ready for more?

In the first question, all of the squares have vertices at grid points.

1. Is there a square whose vertices are at grid points and whose area is 7 square units? Explain how you know.
2. Is there a square whose vertices are at grid points and whose area is 10 square units? Explain how you know.

## 2.3 Cube It

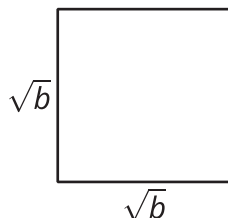


1. A cube has an edge length of 3 units. What is the volume of the cube?
2. A cube has an edge length of 4 units. What is the volume of the cube?
3. A cube has a volume of 8 units. What is the edge length of the cube?
4. A cube has a volume of 7 units. What is the edge length of the cube?
5.  $\sqrt[3]{1,200}$  is between 10 and 11 because  $10^3 = 1,000$  and  $11^3 = 1,331$ . Determine the whole numbers that each of these cube roots lies between:

$$\sqrt[3]{5} \quad \sqrt[3]{10} \quad \sqrt[3]{50} \quad \sqrt[3]{100} \quad \sqrt[3]{500}$$

## Lesson 2 Summary

If a square has a side length of  $s$ , then the area is  $s^2$ . If a square has an area of  $A$ , then the side length is  $\sqrt{A}$ . For a positive number  $b$ , the square root of  $b$  is defined as the positive number that squares to make  $b$ , and it is written as  $\sqrt{b}$ . In other words,  $(\sqrt{b})^2 = b$ . We can also think of  $\sqrt{b}$  as a solution to the equation  $x^2 = b$ . This square has an area of  $b$  because its sides have length  $\sqrt{b}$ :



Similarly, if a cube has an edge length of  $s$ , then the volume is  $s^3$ . If a cube has a volume of  $V$ , then the edge length is  $\sqrt[3]{V}$ . The number  $\sqrt[3]{a}$  is defined as the number that cubes to make  $a$ . In other words,  $(\sqrt[3]{a})^3 = a$ . We can also think of  $\sqrt[3]{a}$  as a solution to the equation  $x^3 = a$ . This cube has a volume of  $a$  because its sides have a length of  $\sqrt[3]{a}$ :

