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Unit 1, Lesson 17

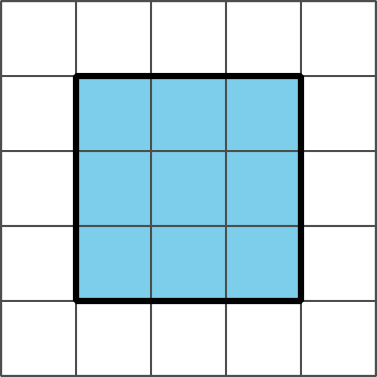
# Squares and Cubes

Let’s investigate perfect squares and perfect cubes.

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## 17.1Perfect Squares

1. The number 9 is a "perfect square." Find four numbers that are perfect squares and two numbers that are not perfect squares.
2. A square has side length 7 in. What is its area?
3. The area of a square is 64 sq cm. What is its side length?



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## 17.2Building with 32 Cubes

Your teacher will give you 32 snap cubes. Use them to build the largest single cube you can. Each small cube has an edge length of 1 unit.

1. How many snap cubes did you use?
2. What is the edge length of the cube you built?
3. What is the area of each face of the built cube? Be prepared to explain your reasoning.
4. What is the volume of the built cube? Be prepared to explain your reasoning.

### Are you ready for more?

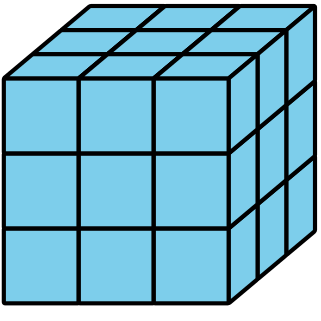
Combine your 32 snap cubes with another group’s 32 snap cubes. Use them to build the largest single cube you can. Each small cube has an edge length of 1 unit.

1. How many snap cubes did you use?
2. What is the edge length of the cube you built?
3. What is the area of each face of the built cube? Show your reasoning.
4. What is the volume of the built cube? Show your reasoning.

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## 17.3Perfect Cubes

1. The number 27 is a "perfect cube." Find four other numbers that are perfect cubes and two numbers that are *not* perfect cubes.
2. A cube has a side length of 4 cm. What is its volume?
3. A cube has a side length of 10 inches. What is its volume?
4. A cube has a side length of units. What is its volume?



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## 17.4Introducing Exponents

Make sure to include correct units of measure as part of each answer.

1. A square has side length 10 cm. Use an **exponent** to express its area.
2. The area of a square is sq in. What is its side length?
3. The area of a square is 81 m2. Use an exponent to express this area.
4. A cube has edge length 5 in. Use an exponent to express its volume.
5. The volume of a cube is cm3. What is its edge length?
6. A cube has edge length units. Use an exponent to write an expression for its volume.

### Are you ready for more?

The number 15,625 is both a perfect square and a perfect cube. It is a perfect square because it equals . It is also a perfect cube because it equals . Find another number that is both a perfect square and a perfect cube. How many of these can you find?

## Lesson 17 Summary

When we multiply two of the same numbers together, such as , we say that we are *squaring* the number. We can write it like this:

The raised 2 in is called an **exponent**.

Because , we write  and we say, “5 **squared** is 25.”

When we multiply three of the same numbers together, such as , we say that we are *cubing* the number. We can write it like this:

Because , we write and we say, “4 **cubed** is 64.”

We also use an exponent for square units and cubic units.

* A square with a side length of 5 inches has an area of 25 in2.
* A cube with an edge length of 4 cm has a volume of 64 cm3.

To read 25 in2, we say “25 square inches,” just like before.

The area of a square with a side length of 7 kilometers is km2. The volume of a cube with an edge length of 2 millimeters is  mm3.

In general, the area of a square with a side length of is , and the volume of a cube with an edge length of is .