

G.G.15 Apply the properties of a right circular cone, including: lateral area equals one-half the product of the slant height and the circumference of its base volume is one-third the product of the area of its base and its altitude

1. Obtain several different size cylinders made of metal or cardboard. Using stiff paper, construct a cone with the same base and height as each cylinder. Fill the cone with rice, then pour the rice into the cylinder. Repeat until the cylinder is filled. Record your data. What is the relationship between the volume of the cylinder and the volume of the corresponding cone? Collect the class data for this experiment. Use the data to write a formula for the volume of a cone with radius r and height h .

2. Analyze the following changes in dimensions of three-dimensional figures to predict the change in the corresponding volumes:

One soup can has dimensions that are twice those of a smaller can.

One box of pasta has dimensions that are three times the dimensions of a smaller box.

The dimensions of one cone are five times the dimensions of another cone.

The dimensions of one triangular prism are x times the dimensions of another triangular prism.

3. Consider a cylinder, a cone, and a sphere that have the same radius and the same height. Sketch and label each figure.

What is the relationship between the volume of the cylinder and the volume of the cone?

What is the relationship between the volume of the cone and the volume of the sphere?

What is the relationship between the volume of the cylinder and the volume of the sphere?

Use the formulas for the volume of a cylinder, a cone, and a sphere to justify mathematically that the relationships are correct.

4. Students in one mathematics class noticed that a local movie theater sold popcorn in different shapes of containers, for different prices. They wondered which of the choices was the best buy. Analyze the three popcorn containers below. Which is the best buy? Explain.

