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# Model solutions to real world problems involving the volume of a sphere by using the relationship to the volume of a cone, Practice Set C

Name:

Date:

1. The radius of a spherical scoop of ice cream is 5.4 cm. Determine the radius and height for **two** different cones that could hold the scoop of ice cream to the nearest tenth of a cubic centimeter without having any melt over the edge of the cones.

| | Cone 1 | Cone 2 |
|---|---|---|
| Radius | | |
| Height | | |

2. A 3-gallon tub of ice cream yields about 90 scoops of ice cream. There are about 3,785 cubic centimeters in a gallon.

a. Determine the radius of each scoop.

b. Determine the radius and height of a cone that a scoop would fit in and justify your reasoning.

c. A new ice cream scoop makes spheres with a radius of 3.6 cm. How many less scoops are there per 3-gallon tub? Show calculations to support your solution.

**Model solutions to real world problems involving the volume of a sphere by using the relationship to the volume of a cone, Practice Set C Answer Key**

1. The radius of a spherical scoop of ice cream is 5.4 cm. Determine the radius and height for **two** different cones that could hold the scoop of ice cream to the nearest tenth of a cubic centimeter without having any melt over the edge of the cones.

| | Cone 1 | Cone 2 |
|---|---|---|
| Radius | 5.4 cm | 6 cm |
| Height | 10.8 cm | 4.4 cm |

Answers will vary, two examples are provided.

2. A 3-gallon tub of ice cream yields about 90 scoops of ice cream. There are about 3,785 cubic centimeters in a gallon.

a. Determine the radius of each scoop.

Multiply 3785 by 3 to determine the total cubic cm to be 11,355 $cm^3$. Then divide by 90 to determine the volume of each scoop to be 126.17 $cm^3$. Then divide by 4/3*pi and take the cubed root to get about **3.1 cm.**

b. Determine the radius and height of a cone that a scoop would fit in and justify your reasoning.

A scoop would fit in a cone of radius 3.1 cm and height 6.2, because a sphere is twice the volume of a cone with the same radius and height of 2r, so if you double the height of the cone, you double the volume of the cone and the whole sphere would fit. *Other size dimensions are possible, answers may vary.*

c. A new ice cream scoop makes spheres with a radius of 3.6 cm. How many less scoops are there per 3-gallon tub? Show calculations to support your solution.

The scoop with radius 3.6 cm would have a volume of 195.3 $cm^3$. If you divide the total number of cubic cm in the tub, 11,355 by 195.3, you get 58.13 which is the new number of scoops per tub. Therefore, there are about **32** less scoops of ice when using the new scoop.