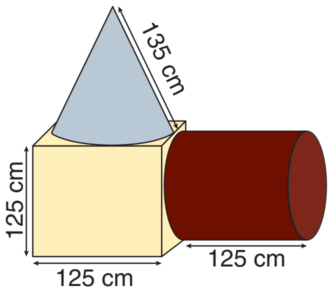
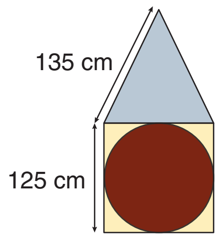
Check Up



Right Side View:



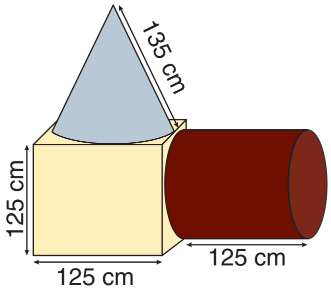
1. Determine the volume, to the nearest hundredth, of the conical part of the playground apparatus shown.

2. After some vigorous play, the conical part was damaged, and it was decided that a better replacement would be a right square pyramid. The pyramid will be the same height as the cone, but will have a base length that is 5 cm longer than the base length of the cube. Determine the volume of the right square pyramid, to the nearest hundredth.

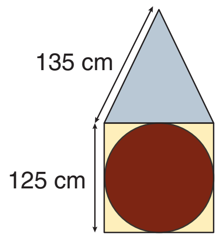
3. If the cylindrical apparatus' length is doubled, what will be its new volume, to the nearest hundredth?

4. After all of the changes, what will be the volume, to the nearest hundredth, of the modified playground apparatus?

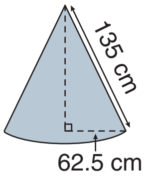
☑ Compare your answers.



Right Side View:



1. Determine the volume, to the nearest hundredth, of the conical part of the playground apparatus shown.



$$a^2 + b^2 = c^2$$
$$h^2 + (62.5\text{ cm})^2 = (135\text{ cm})^2$$
$$h^2 + 3\,906.25\text{ cm}^2 = 18\,225\text{ cm}^2$$
$$h^2 + \cancel{3\,906.25\text{ cm}^2} - \cancel{3\,906.25\text{ cm}^2} = 18\,225\text{ cm}^2 - 3\,906.25\text{ cm}^2$$
$$h^2 = 14\,318.75\text{ cm}^2$$
$$\sqrt{h^2} = \sqrt{14\,318.75\text{ cm}^2}$$
$$h = 119.660\ldots\text{ cm}$$

$$V_{\text{right cone}} = \frac{1}{3}\pi r^2 h$$
$$V_{\text{right cone}} = \frac{1}{3}\pi(62.5\text{ cm})^2 \cdot 119.660\ldots\text{ cm}$$
$$V_{\text{right cone}} = \frac{1}{3}\pi \cdot 3\,906.25\text{ cm}^2 \cdot 119.660\ldots\text{ cm}$$
$$V_{\text{right cone}} = \frac{1}{3}\pi \cdot 467\,425.700\ldots\text{ cm}^3$$
$$V_{\text{right cone}} \doteq 489\,487.05\text{ cm}^3$$

2. After some vigorous play, the conical part was damaged, and it was decided that a better replacement would be a right square pyramid. The pyramid will be the same height as the cone, but will have a base length that is 5 cm longer than the base length of the cube. Determine the volume of the right square pyramid, to the nearest hundredth.

$l = 125\text{ cm} + 5\text{ cm} = 130\text{ cm}$

$w = 125\text{ cm} + 5\text{ cm} = 130\text{ cm}$

Let $l = 130\text{ cm},\ w = 130\text{ cm},$ and $h = 119.660\ldots\text{cm}$

$$V_{\text{right pyramid}} = \frac{1}{3}lwh$$
$$V_{\text{right pyramid}} = \frac{1}{3} \cdot 130\text{ cm} \cdot 130\text{ cm} \cdot 119.660\ldots\text{cm}$$
$$V_{\text{right pyramid}} = \frac{1}{3} \cdot 2\,022\,270.552\text{ cm}^3$$
$$V_{\text{right pyramid}} \doteq 674\,090.18\text{ cm}^3$$

The volume of the new pyramid is approximately 674 090.18 cm^3.

3. If the cylindrical apparatus' length is doubled, what will be its new volume, to the nearest hundredth?

   $l = 2 \times 125 \text{ cm} = 250 \text{ cm}$

   Let $l = 250$ cm, and $r = 62.5$ cm

   $V_{\text{right cylinder}} = \pi r^2 h$

   $V_{\text{right cylinder}} = \pi(62.5 \text{ cm})^2 \cdot 250 \text{ cm}$

   $V_{\text{right cylinder}} = \pi \cdot 976\,562.5 \text{ cm}^3$

   $V_{\text{right cylinder}} \doteq 3\,067\,961.58 \text{ cm}^3$

4. After all of the changes, what will be the volume, to the nearest hundredth, of the modified playground apparatus?

   Add the volumes of the pyramid, the longer cylinder, and the cube.

   $V_{\text{modified apparatus}} = V_{\text{cube}} + V_{\text{longer cylinder}} + V_{\text{pyramid}}$

   $V_{\text{modified apparatus}} \doteq (125 \text{ cm})^3 + 3\,067\,961.58 \text{ cm}^3 + 674\,090.18 \text{ cm}^3$

   $V_{\text{modified apparatus}} \doteq 1\,953\,125 \text{ cm}^3 + 3\,067\,961.58 \text{ cm}^3 + 674\,090.18 \text{ cm}^3$

   $V_{\text{modified apparatus}} \doteq 5\,695\,176.76 \text{ cm}^3$

Summary

Structure, dimension, depth, girth, volume, and surface area transform the visual into physical. People interact with objects for transportation, work, and play. Learning about what makes up the composite objects used in life helps people understand and appreciate the usefulness of everything they interact with each day.