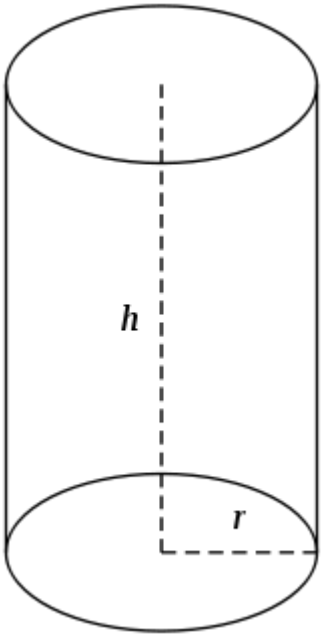
1. Use the diagram and the information below to complete the exercise that follows.

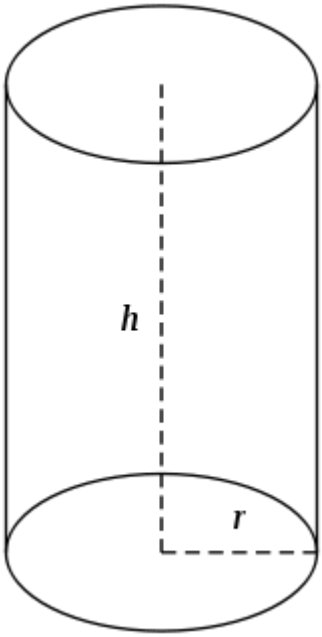


The diagram shows a right cylinder with a radius r and height h. A beverage company wants to make a right cylindrical can that holds 500 cm^3 of juice. Assume the thickness of the material used to make the can is negligible.

- Use your knowledge of volume and surface area to derive a function A(r) that represents the surface area of the can in terms of the radius, r, of its base;
- use your calculator to produce a graph of A(r) that shows the intercepts, extrema, and asymptotic behavior of the function over the set of real numbers, sketch the graph you obtained, and identify the window you used;
- state any restriction on the domain of the function so that it represents the physical model of the can; and
- use your calculator to find the dimensions of the can to the nearest tenth of a centimeter that will minimize the quantity of material needed to manufacture the can.

Be sure to show your work and explain the steps you used to obtain your answers.

1.a. Use the diagram and the information below to complete the exercise that follows.

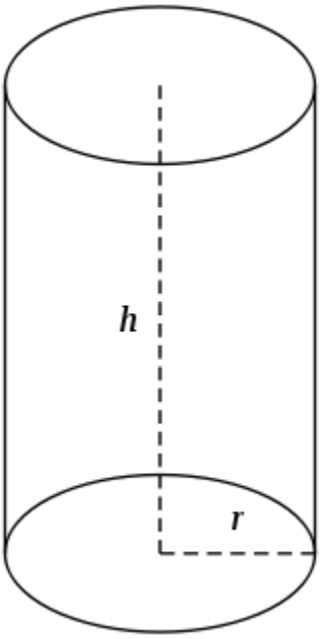


The diagram shows a right cylinder with a radius r and height h. A beverage company wants to make a right cylindrical can that holds 900 cm^3 of juice. Assume the thickness of the material used to make the can is negligible.

- Use your knowledge of volume and surface area to derive a function A(r) that represents the surface area of the can in terms of the radius, r, of its base;
- use your calculator to produce a graph of A(r) that shows the intercepts, extrema, and asymptotic behavior of the function over the set of real numbers, sketch the graph you obtained, and identify the window you used;
- state any restriction on the domain of the function so that it represents the physical model of the can; and
- use your calculator to find the dimensions of the can to the nearest tenth of a centimeter that will minimize the quantity of material needed to manufacture the can.

Be sure to show your work and explain the steps you used to obtain your answers.

2. Use the diagram and the information below to complete the exercise that follows.

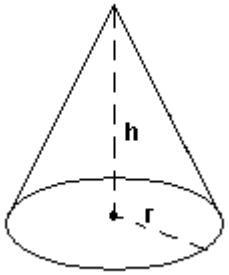


The diagram shows a right cylinder with a radius r and height h. A beverage company wants to make a right cylindrical can uses 500 cm^2 of metal material. Assume the thickness of the material used to make the can is negligible.

- Use your knowledge of volume and surface area to derive a function V(r) that represents the volume of the can in terms of the radius, r, of its base;
- use your calculator to produce a graph of V(r) that shows the intercepts, extrema, and asymptotic behavior of the function over the set of real numbers, sketch the graph you obtained, and identify the window you used;
- state any restriction on the domain of the function so that it represents the physical model of the can; and
- use your calculator to find the dimensions of the can to the nearest tenth of a centimeter that will maximize the quantity of juice the can will hold.

Be sure to show your work and explain the steps you used to obtain your answers.

3. Use the diagram and the information below to complete the exercise that follows.

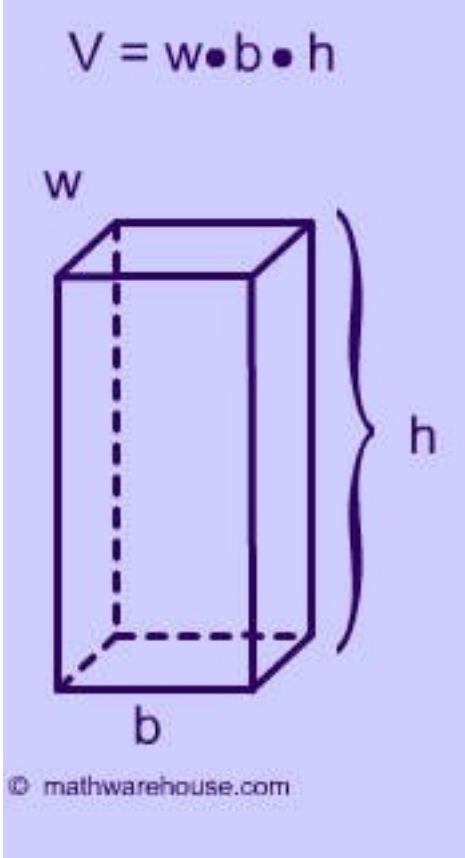


The diagram shows a cone with a radius r and height h. A beverage company wants to make a conical can (funny shaped can?) that holds 500 cm^3 of juice. Assume the thickness of the material used to make the can is negligible.

- Use your knowledge of volume and surface area to derive a function A(r) that represents the surface area of the can in terms of the radius, r, of its base;
- use your calculator to produce a graph of A(r) that shows the intercepts, extrema, and asymptotic behavior of the function over the set of real numbers, sketch the graph you obtained, and identify the window you used;
- state any restriction on the domain of the function so that it represents the physical model of the can; and
- use your calculator to find the dimensions of the can to the nearest tenth of a centimeter that will minimize the quantity of material needed to manufacture the can.

Be sure to show your work and explain the steps you used to obtain your answers.

4. Use the diagram and the information below to complete the exercise that follows.



The diagram shows a square base rectangular prism with a radius r and height h. A beverage company wants to make a prism shaped can (still a funny shaped can?) that holds 500 cm^3 of juice. Assume the thickness of the material used to make the can is negligible.

- Use your knowledge of volume and surface area to derive a function A(b) that represents the surface area of the can in terms of the radius, r, of its base;
- use your calculator to produce a graph of A(b) that shows the intercepts, extrema, and asymptotic behavior of the function over the set of real numbers, sketch the graph you obtained, and identify the window you used;
- state any restriction on the domain of the function so that it represents the physical model of the can; and
- use your calculator to find the dimensions of the can to the nearest tenth of a centimeter that will minimize the quantity of material needed to manufacture the can.

Be sure to show your work and explain the steps you used to obtain your answers.