Compound volume
Add volumes

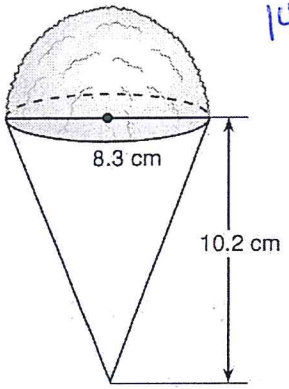
Name Schlansky
Mr. Schlansky

Date _____
Geometry

Compound and Displaced Volume

Find the compound volume of the following shapes rounded to the *nearest tenth of a unit*.

1.

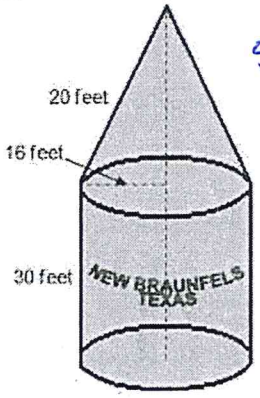


149.613... + 183.96...
333.7 cm³

Hemisphere
$V = \frac{1}{2}(\frac{4}{3}\pi r^3)$
$V = \frac{1}{2}(\frac{4}{3}\pi(4.15)^3)$
$V = 149.613...$

Cone
$V = \frac{1}{3}\pi r^2 h$
$V = \frac{1}{3}\pi(4.15)^2(10.2)$
$V = 183.96...$

2.

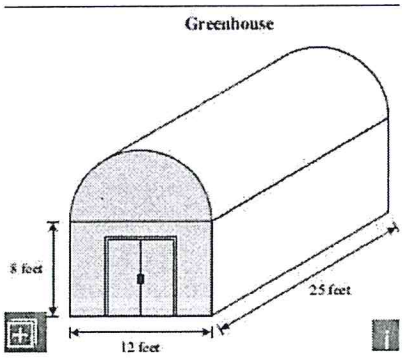


5361... + 2412...
29489.1 ft³

Cone
$V = \frac{1}{3}\pi r^2 h$
$V = \frac{1}{3}\pi(16)^2(20)$
$V = 5361...$

Cylinder
$V = \pi r^2 h$
$V = \pi(16)^2(30)$
$V = 24127.43...$

3.

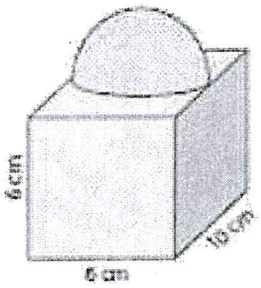


½ cylinder
$V = \frac{1}{2}\pi r^2 h$
$V = \frac{1}{2}\pi(6)^2(25)$
$V = 1413.7...$

rectangular prism
$V = lwh$
$V = 8(12)(25)$
$V = 2400$

1413.7... + 2400
3813.7 ft³

4.



rectangular prism
$V = lwh$
$V = 6(6)(10)$
$V = 360 cm^3$

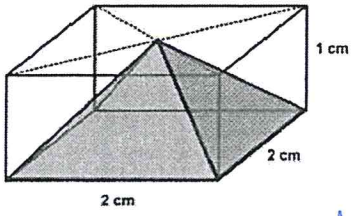
hemisphere
$V = \frac{1}{2}(\frac{4}{3}\pi r^3)$
$V = \frac{1}{2}(\frac{4}{3}\pi(3)^3)$
$V = 56.548...$

360 + 56.548...
416.5 cm³

Displaced volume
Subtract volumes

Find the compound volume of the following shapes rounded to the *nearest tenth of a unit*.

5.



Rectangular Prism

$V = lwh$

$V = 2(2)(1)$

$V = 4 cm^3$

Pyramid

$V = \frac{1}{3}lwh$

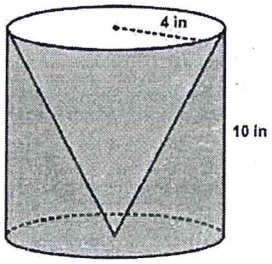
$V = \frac{1}{3}(2)(2)(1)$

$V = \frac{4}{3} cm^3$

$4 - \frac{4}{3}$

$\frac{8}{3} cm^3$

6.



Cylinder

$V = \pi r^2 h$

$V = \pi(4)^2(10)$

$V = 502.65...$

Cone

$V = \frac{1}{3}\pi r^2 h$

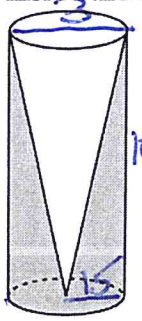
$V = \frac{1}{3}\pi(4)^2(10)$

$V = 167.55...$

$502.65... - 167.55...$

$335 in^3$

7. In the shape below, a cone is placed inside of a cylinder. The cone and cylinder both have a height of 10 inches and a diameter of 3 inches. What is the volume of the space inside the cylinder but not inside the cone?



Cylinder

$V = \pi r^2 h$

$V = \pi(1.5)^2(10)$

$V = 70.68...$

Cone

$V = \frac{1}{3}\pi r^2 h$

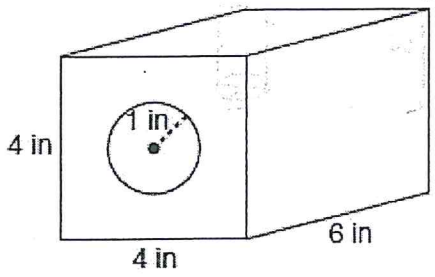
$V = \frac{1}{3}\pi(1.5)^2(10)$

$V = 23.56...$

$70.68... - 23.56...$

$47 in^3$

8. A solid metal prism has a rectangular base with sides of 4 inches and 6 inches, and a height of 4 inches. A hole in the shape of a cylinder, with a radius of 1 inch, is drilled through the entire length of the rectangular prism. What is the approximate volume of the remaining solid, in cubic inches?



$V_{Rect\ Prism} = lwh$ $V_{cylinder} = \pi r^2 h$

$V_R = 4(4)(6)$ $V_c = \pi(1)^2(6)$

$V_R = 96 in^3$ $V_c = 18...$

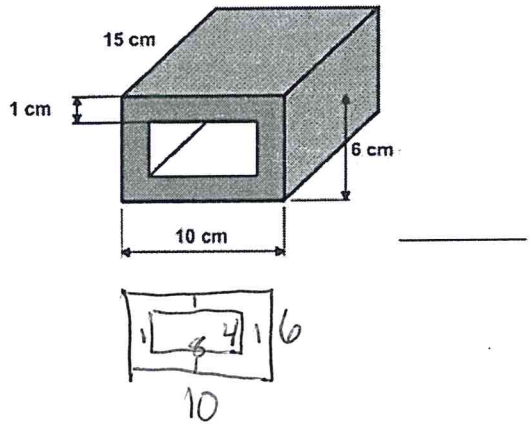
$96 - 18... = 77.15...$

$77 in^3$

9. A box tube is to be constructed out of 1 cm thick metal that has a width of 10 cm, a height of 6 cm, and a depth of 15 cm. Which of the following represents the volume of the metal used?

(1) 420 cm^3 (3) 640 cm^3

(2) 540 cm^3 (4) 760 cm^3



Outside: $V_{Rect\ Prism} = lwh$

$V = 10(6)(15)$

$V = 900 cm^3$

Inside: $V_{Rect\ Prism} = lwh$

$V = 8(4)(15)$

$V = 480 cm^3$

$900 - 480 = 420 cm^3$

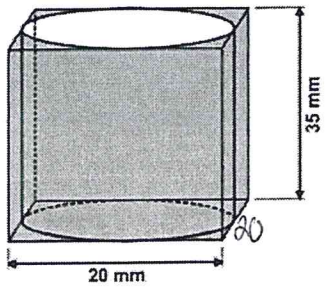
10. A piece of hardware is constructed by drilling a cylindrical hole through a right prism with a square base that measures 20 mm on each side. The hole is 35 mm long, as shown in the diagram. Determine the volume of the remaining material once the hole has been drilled. Round your answer to the nearest cubic millimeter.

$V_{rect\ prism} = lwh$ $V_{cylinder} = \pi r^2 h$

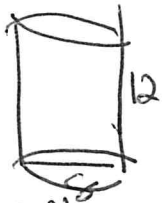
$V_R = 20(20)(35)$ $V_c = \pi(10)^2(35)$

$V_R = 14{,}000$ $V_c = 10995...$

$14{,}000 - 10995... = 3004 mm^3$



11. The paper towel roll shown below has a diameter of 8 inches and the paper has a thickness of 3 inches. If the height of the paper towel roll is 12 inches, what is the volume of the paper towels? Round your answer to the nearest tenth of a cubic inch.

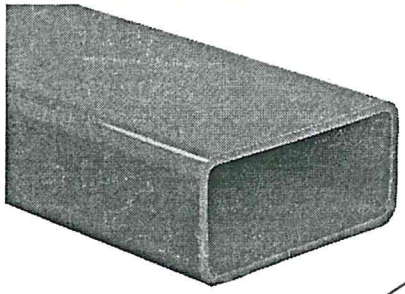


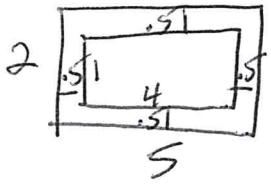
$V=\pi r^2 h$
$V=\pi(4)^2(12)$
$V=603...$

$V=\pi r^2 h$
$V=\pi(1)^2(12)$
$V=37...$

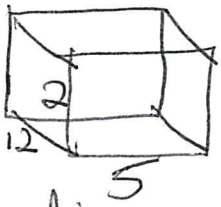
$603... - 37... = 565.5$

12. A hollow metal pipe is in the shape of a rectangular prism that has a height of 12 cm. The length is 5 cm and the width is 2 cm. If the thickness is 0.5 cm all the way around, what is the volume of the metal?

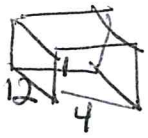




outside



inside

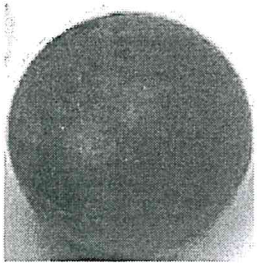


$120-48$
$72\ cm^3$

$V=lwh$
$V=5(2)(12)$
$V=120\ cm^3$

$V=lwh$
$V=4(1)(12)$
$V=48\ cm^3$

13. Lindor Lindt is a hollow chocolate sphere with a diameter of 32 mm. If the chocolate has a thickness of 6 mm, what is the volume of the chocolate in one piece? Round your answer to the nearest tenth of a cubic millimeter.



outside

inside

$V=\frac{4}{3}\pi r^3$
$V=\frac{4}{3}\pi(16)^3$
$V=17157...$

$V=\frac{4}{3}\pi r^3$
$V=\frac{4}{3}\pi(10)^3$
$V=4188...$

$17157... - 4188...$
$12968.5\ mm^3$