

WARMUP #4

Copy and complete the table for spheres.

| | | | | | | |
|---------------|--|----|--|---------|--|---------------------|
| | | 2. | | 4. | | 6. |
| Radius | | 8 | | ? | | ? |
| Area | | ? | | 36π | | ? |
| Volume | | ? | | ? | | $\frac{4000\pi}{3}$ |

2. A ; V

4. r ; V

6. r ; A

A plane passes h cm from the center of a sphere with radius r cm. Find the area of the circle of intersection, shaded in the diagram, for the given values.

8. $r = 17$

$h = 8$

SECTION 12.3:

CYLINDERS AND CONES

Standards:

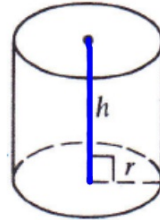
8.0: Students know, derive, and solve problems involving the perimeter, circumference,

area, volume, lateral area, and surface area of common geometric figures.

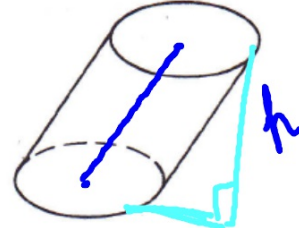
9.0: Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.

11.0: Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.

- ★ A cylinder is like a prism but its bases are circles instead of polygons. (no lateral edges)
- ★ **Altitude:** the segment joining the centers of the bases (height for RIGHT cylinders)
- ★ **Height (h)** is the length of the altitude.
- ★ **The radius of the base is also the radius of the cylinder.**



right
cylinder



oblique
cylinder

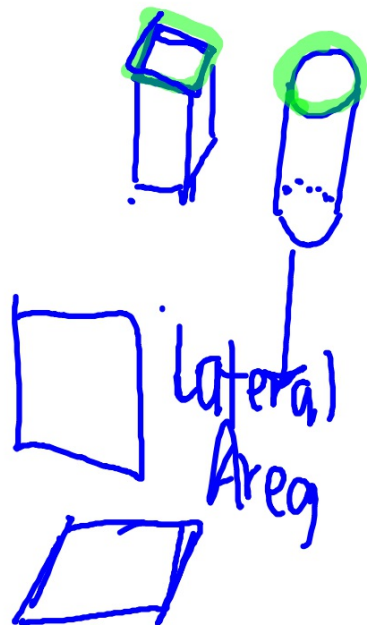


LATERAL AREA

The LA of a cylinder equals the circumference of a base times the height of the cylinder

$$LA = ph$$

$$LA = 2\pi rh$$

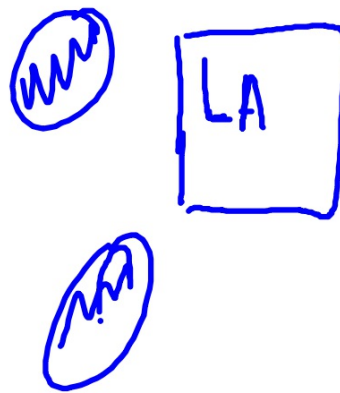


TOTAL AREA

The TA of a cylinder is the LA plus twice the area of a base

$$TA = LA + 2B$$

$$TA = 2\pi rh + 2\pi r^2$$



VOLUME

The V of a cylinder equals the area of a base times the height of the cylinder

$$V = Bh$$

$$V = \pi r^2 h$$

B = Base Area

P = perimeter of base

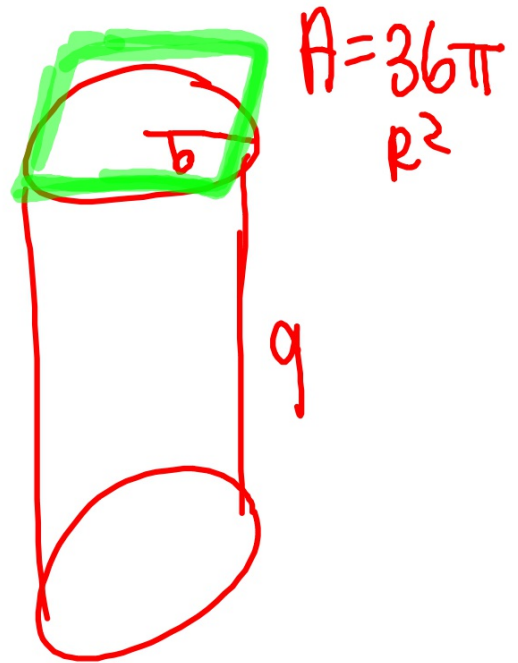
I-2: Find (a) the lateral area, (b) the total area, and (c) the volume of each cylinder.

2) $r = 6$; $h = 9$

LA 108π
 $+ 72\pi$
TA $\frac{180\pi}{}$

V 324π
 $(36\pi \cdot 9)$

$C = 2\pi R$
 $= 62\pi$
 $C = 12\pi$



3) The lateral area of a cylinder is 96π . If $h = \underline{12}$, find r .

r

4) The volume of a cylinder is 375π . If $h = 15$, find the lateral area.

LA

5) The lateral area of a cylinder is 96π . If $r = \underline{8}$, find the volume.

V

6) The total area of a cylinder is $256\pi \text{ cm}^2$. If $r = \underline{h}$, find r .

r

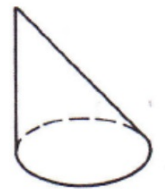
★ A cone is like a pyramid, but its base is a circle.

★ The segment joining the vertex of a cone to the center of the base is the altitude with height h .

★ The slant height, l , is the hypotenuse of a right \triangle formed by the altitude and the radius.



right
cone



oblique
cone



| LATERAL AREA | TOTAL AREA | VOLUME |
|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <p>The LA of a cone equals half the circumference of the base times the slant height</p> $LA = \frac{1}{2}pl$ $LA = \pi r l$ | <p>The TA of a cone equals the LA plus the area of the base</p> $TA = LA + B$ $TA = \pi r l + \pi r^2$ | <p>The V of a cone equals 1/3 the area of the base times the height of the cone</p> $V = \frac{1}{3}Bh$ $V = \frac{1}{3}\pi r^2 h$ |

7-10: Complete the table for the cone shown.



| | r | h | l | L.A. | T.A. | V |
|-----|-----|-----|-----|----------|------|----------|
| 7) | 3 | ★ | 5 | ★ | ★ | ★ |
| 8) | 10 | 24 | ★ | ★ | ★ | ★ |
| 9) | 8 | ★ | ★ | 136π | ★ | ★ |
| 10) | 7 | ★ | ★ | ★ | ★ | 392π |



11) A cone has volume $432\pi \text{ cm}^3$ and height 9 cm. Find its slant height.



12) A cone has lateral area 100π and total area 136π Find its radius.



HOMWORK

Assignment #12.3

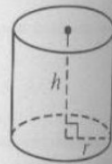
- Pages 492-493 #1-16, 20, 21
- Pages 500-501 #16, 19

(partner)
WED APRIL 25th - QUIZ CH 12

FRI APRIL 27th - TEST CH 12

Written Exercises

You can use the following three steps to sketch a cylinder.



(1) Draw two congruent ovals, one above the other.

(2) Join the ovals with two vertical segments.

(3) Draw in the altitude and a radius.

Sketch each cylinder. Then find its lateral area, total area, and volume.

1. $r = 4; h = 5$
2. $r = 8; h = 10$
3. $r = 4; h = 3$
4. $r = 8; h = 15$
5. The volume of a cylinder is 64π . If $r = h$, find r .
6. The lateral area of a cylinder is 18π . If $h = 6$, find r .
7. The volume of a cylinder is 72π . If $h = 8$, find the lateral area.
8. The total area of a cylinder is 100π . If $r = h$, find r .

Sketch each cone. Copy and complete the table.

| | r | h | l | L.A. | T.A. | V |
|-----|-----|-----|-----|----------|------|----------|
| 9. | 4 | 3 | ? | ? | ? | ? |
| 10. | 8 | 6 | ? | ? | ? | ? |
| 11. | 12 | ? | 13 | ? | ? | ? |
| 12. | ? | 2 | 6 | ? | ? | ? |
| 13. | ? | ? | 15 | 180π | ? | ? |
| 14. | 21 | ? | ? | 609π | ? | ? |
| 15. | 15 | ? | ? | ? | ? | 600π |
| 16. | 9 | ? | ? | ? | ? | 324π |

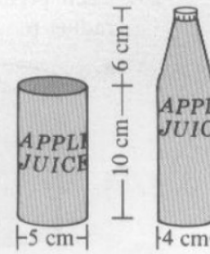


19. A cone and a cylinder both have height 48 and radius 15. Give the ratio of their volumes without calculating the two volumes.

20. a. Guess which contains more, the can or the bottle. (Assume that the top part of the bottle is a complete cone.)

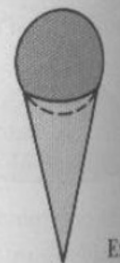
b. See if your guess is right by finding the volumes of both.

21. A solid metal cylinder with radius 6 cm and height 18 cm is melted down and recast as a solid cone with radius 9 cm. Find the height of the cone.



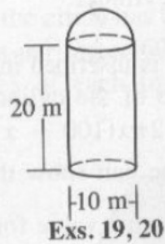
Ex. 20

15. A sphere has radius 2 and a hemisphere ("half" a sphere) has radius 4. Compare their volumes.
16. A scoop of ice cream with diameter 6 cm is placed in an ice-cream cone with diameter 5 cm and height 12 cm. Is the cone big enough to hold all the ice cream if it melts?
17. Approximately 70% of the Earth's surface is covered by water. Use a calculator to find the area covered by water to the nearest million square kilometers. (The radius of the Earth is approximately 6380 km.)



Ex

19. A silo of a barn consists of a cylinder capped by a hemisphere, as shown. Find the volume of the silo.
20. About two cans of paint are needed to cover the hemispherical dome of the silo shown. Approximately how many cans are needed to paint the rest of the silo's exterior?



Exs. 19, 20

