Ms. Herrington's NTI Days 11-20 Math Assignments

Topic: Volume of Cylinder, Cone, and Sphere

Day 11: Review of finding area of a circle

Day 12 – 14: Volume of a Cylinder

Day 15 – 16: Volume of a Cone

Day 17 – 18: Volume of a Sphere

Day 19: Mixed Practice

Day 20: Volume Quiz

Comments:

I have completed many examples that you can use as a guide to help you complete this packet. This is an easy topic and I know you all will do well. Just fill in the formula and simplify using your calculator! There are some problems that are challenging, but try your best.

If you have any questions, you can contact me four different ways:

1. Call the school (859) 234-7123
2. Email me at melody.herrington@harrison.kyschools.us
3. Message me on Remind101 (Send @hbc3c8 to 81010 to join)
4. Text me at (859) 749-6499

*QR Answer key included at the end (scan the code with your phone camera). Maybe it's a bad idea, but doing ten days worth of math incorrectly can lead to misconceptions, so I included the answer key. You need to know this content. It's not that difficult. Try working through a section and then check your answers. If you aren't getting them correct, contact me.

Basic Pre-algebra Skill use 3.14 for π

Day 11

Finding the Area of a Circle

Area of a circle: πr^2 (r = half the distance across a circle)

Find the area of each. Round to the nearest tenth.

1)

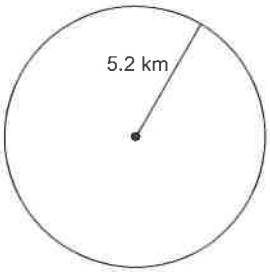
$A = \pi r^2$

$A = 3.14(12)^2$

$A = 3.14(144)$

$A = 452.2 \text{ mi}^2$

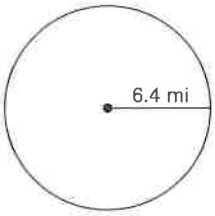
I need to see this much work for each problem

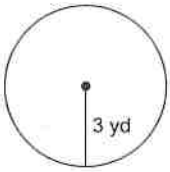
2) 

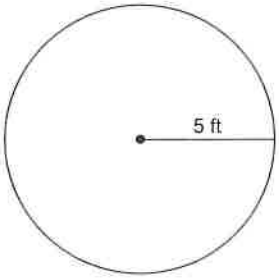
$A = 3.14(5.2)^2$

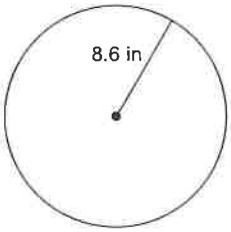
$A = 3.14(27.04)$

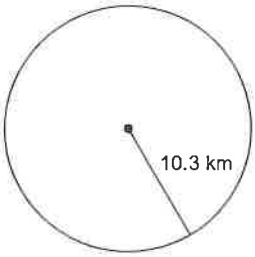
$A = 84.9 \text{ km}^2$

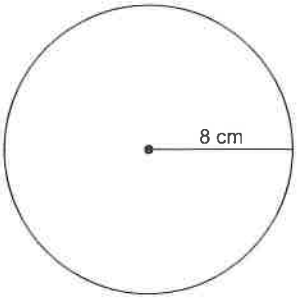
3) 

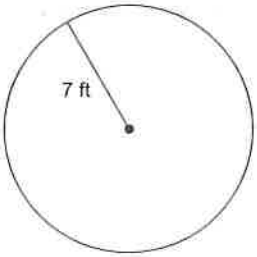
4) 

5) 

6) 

7) 

8) 

9) 

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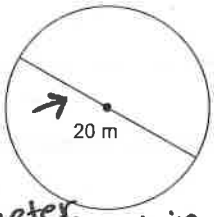
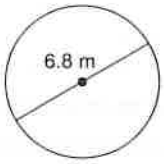
11) 

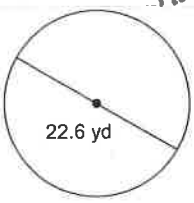
This is the diameter. Cut in half to get radius

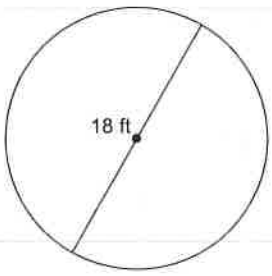
$A = 3.14(10^2)$

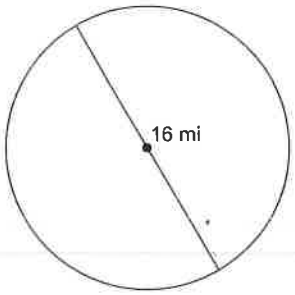
$A = 3.14(100)$

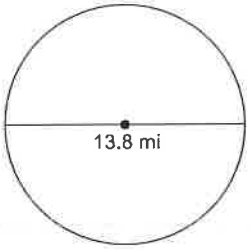
$A = 314 m^2$

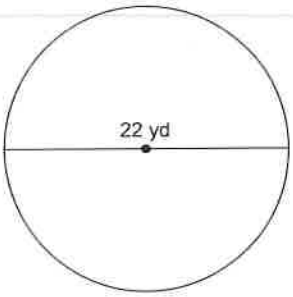
12) 

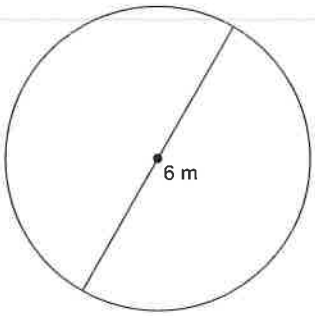
13) 

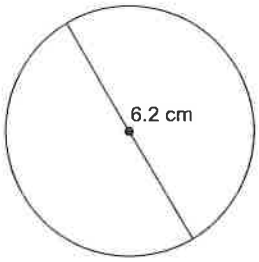
14) 

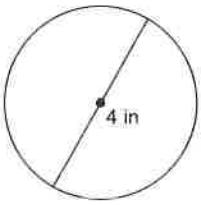
15) 

16) 

17) 

18) 

19) 

20) 

Unit: Volume
Student Handout 1

Notes

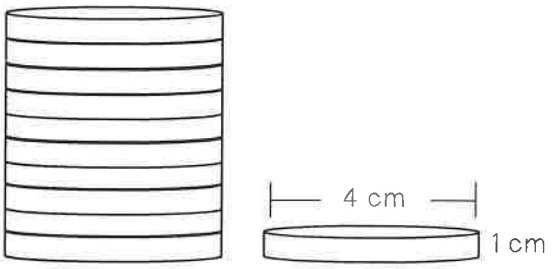
Day 12

Name _____

Date _____ Pd____

VOLUME OF CYLINDERS

A cylindrical stack of coins is shown below. The dimensions of an individual coin are shown as well.



If you needed to find the amount of space taken up by the stack of coins, how could you use the dimensions of the individual coin to help?

Formula for volume of a cylinder:

$V = \pi r^2 h$

VOLUME

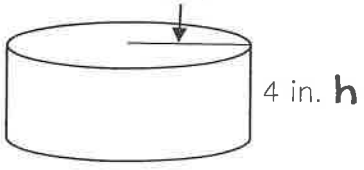
- Volume is the amount of 3-dimensional space occupied by an object. Volume can also be referred to as Capacity.

VOLUME OF CYLINDERS

- To find the volume of a cylinder, multiply the area of the base by the height of the cylinder.
- The formula can be written as V = Bh. Describe each variable:
  - V = Volume
  - B = area of base
  - h = height
- The base of a cylinder will always be a Circle, so to find the area of the base, use the formula πr^2.
  - radius (half distance across circle)

Find the volume of each cylinder. Use 3.14 for π.

1.



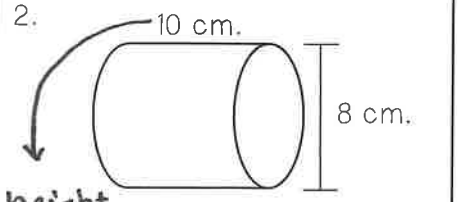
Formula: $\pi r^2 h$

Plug in values: $3.14(6^2)(4)$

Volume: $452.16\ in^3$

3D so we cube

2.



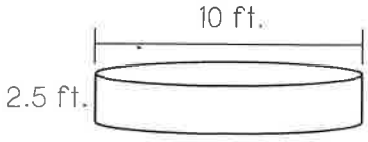
height (the distance between bases)

Formula: $\pi r^2 h$

Plug in values: $3.14(4^2)10$

Volume: $502.4\ cm^3$

3.



Formula: $\pi r^2 h$

Plug in values: $3.14(5^2)2.5$

Volume: $196.25\ ft^3$

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Volume of Cylinders

Name_____

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use 3.14 for π

Find the volume of each figure. Round your answers to the nearest tenth if necessary.

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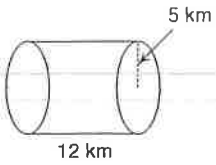

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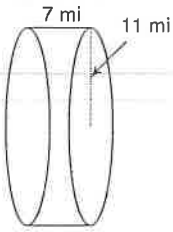

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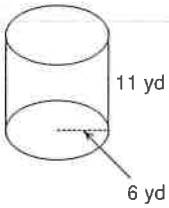

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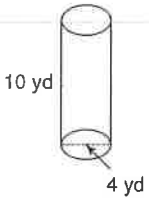

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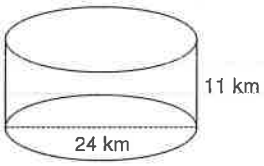

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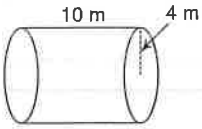

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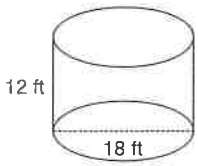

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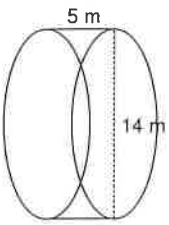

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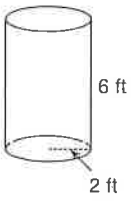

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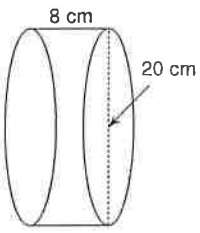

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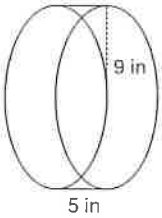

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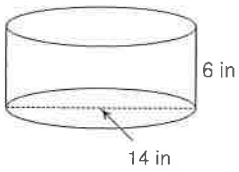

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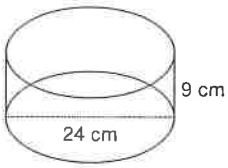

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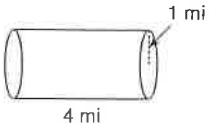

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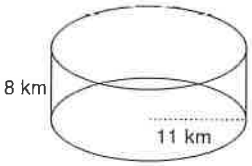

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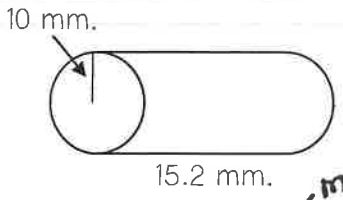
Day 13

To leave an answer "in terms of pi" means to multiply everything except for π, and simply leave the π symbol in your solution.

Use π key on calculator (or 3.14 if needed)

Find the volume of each cylinder below, both in terms of π and rounded to the nearest tenth.

4.

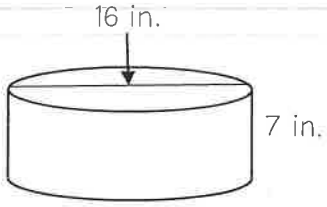


$V = \pi (10^2)(15.2)$ ← multiply that

In terms of π: $1520\pi \text{ mm}^3$

Nearest tenth: 4775.2 mm^3

5.

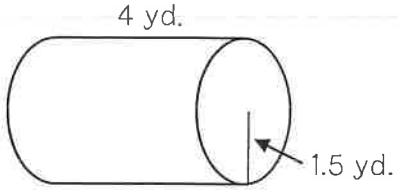


$V = \pi (8^2)(7)$

In terms of π: $448\pi \text{ in}^3$

Nearest tenth: 1407.4 in^3

6.



In terms of π: _____

Nearest tenth: _____

Use what you've learned about the volume of cylinders to answer each question below.

7. The area of the base of a cylinder is 150 square inches. If the volume of the cylinder is 1,050 in.^{3}, what is the height of the cylinder?

$V = (\pi r^2)h$ solve for h

$1050 = 150h$

8. The volume of a cylinder is 942 cubic feet. If the height of the cylinder is 12 feet, what is the radius of the cylinder?

Finish

$\frac{942}{12} = \frac{3.14 r^2 (12)}{12}$

$r^2 = 25$

$\frac{78.5}{3.14} = \frac{3.14 r^2}{3.14}$

9. Leann has a cylindrical water tank in her backyard that has a diameter of 3 meters and a height of 2 meters. What is the capacity of the water tank? (volume)

10. Drew and Beau both have cylindrical water bottles. Drew's water bottle has a diameter of 6 inches and a height of 7 inches. Beau's water bottle has a diameter of 4 inches and a height of 9 inches. Who's water bottle holds more water, and how much more water does it hold?

Summarize today's lesson:

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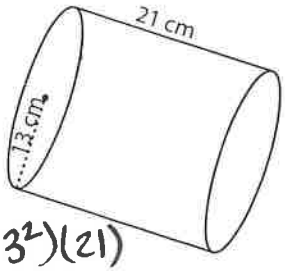
Name : _____ Score : _____

Volume - Cylinder

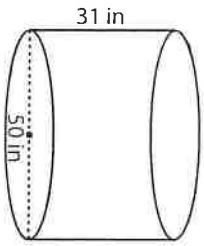
Leave your answer in terms of π

Find the volume of each cylinder.

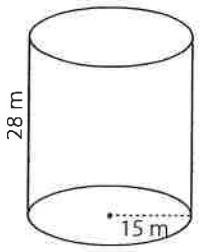
1) 

$V = \pi(13^2)(21)$

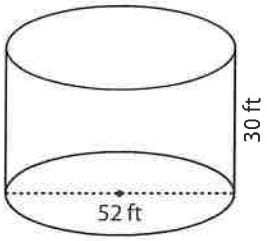
Volume = $3549\pi\ cm^3$

2) 

Volume = _____

3) 

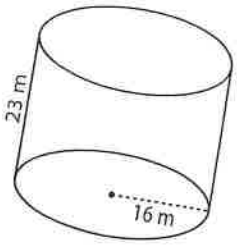
Volume = _____

4) 

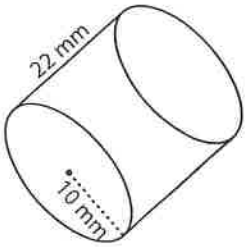
Volume = _____

5)

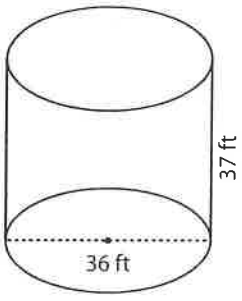
Volume = _____

6) 

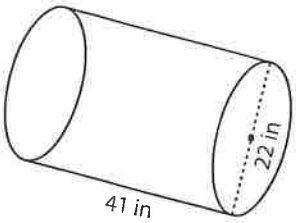
Volume = _____

7) 

Volume = _____

8) 

Volume = _____

9) 

Volume = _____

10) Find the amount of wax required to make a candle with radius 22 millimeter and height 61 millimeter.

Volume = _____

Unit: Volume
Homework 1

Day 14

Name _____

Date _____ Pd_____

VOLUME OF CYLINDERS

Use the your knowledge of the volume formula to solve the questions below. Show all work, and use 3.14 for π.

1. Which is the correct description of how to find the volume of a cylinder?

A. Find the circumference of the base and multiply it by the height of the cylinder.
B. Find the area of the base and multiply it by height of the cylinder.
C. Square the area of the base and multiply it by the height of the cylinder.
D. Find the area of the base and add it to the height of the cylinder.

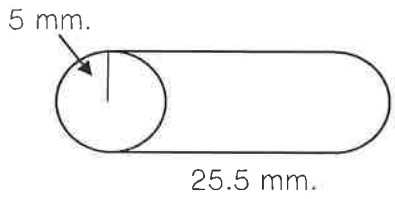
2. Eric needs to find the area of the base of a cylinder. Which formula will help him?

A. $2\pi r$
B. $2\pi rh$
C. πr^2
D. $\frac{1}{2}bh$

3. Mrs. Pitts wrote the volume formula as "V=Bh". What does "B" represent?

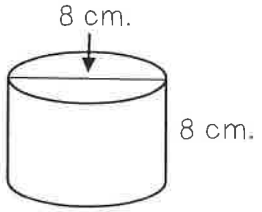
A. The radius of the base.
B. The diameter of the base.
C. The circumference of the base.
D. The area of the base.

4. Find the volume of the cylinder. Leave your answer in terms of π.



_____

5. Find the volume of the cylinder. Leave your answer in terms of π.



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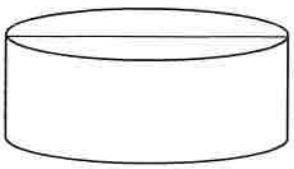
6. The cylinder shown has a diameter of 11 inches. Find the volume of the cylinder. Round your solution to the nearest tenth.



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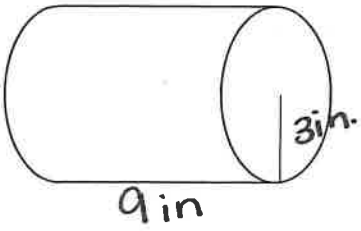
7. The cylinder shown has a radius of 3 inches. The height is three times the radius. Find the volume of the cylinder. Round your solution to the nearest tenth.



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Challenge

* 8. A cylindrical basket has a volume of 15 cubic feet. If the height of the basket is 1.5 feet, what is the area of the base of the basket?

_____

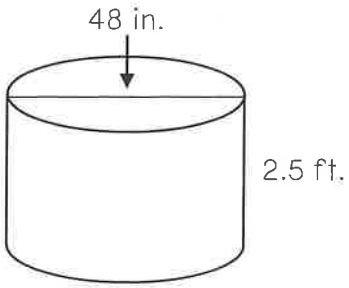
9. A container of candy is shaped like a cylinder and has a volume of 125.6 cubic centimeters. If the height of the container is 10 centimeters, what is the radius of the container?

$125.6 = 3.14 r^2 (10)$ Solve for r

_____

10. Jacob needs to know the volume of the cylinder shown. Which expression will give him the correct volume?

A. $3.14(48^2)(2.5)$
B. $3.14(24^2)(2.5)$
C. $3.14(2^2)(2.5)$
D. $3.14(1^2)(2.5)$



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Day 15

Unit: Volume
Student Handout 2

Notes

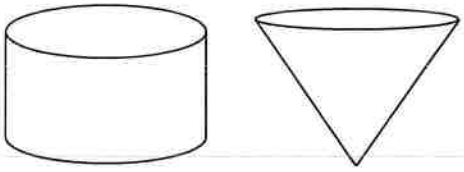
Name _____

Date _____ Pd _____

VOLUME OF CONES

EXAMPLE 1:

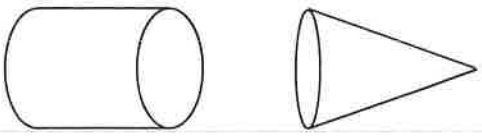
The cylinder and cone below have the same radius and the same height.



$V = 120$ IN.^{3} $V = 40$ IN.^{3}

EXAMPLE 2:

The cylinder and cone below have the same radius and the same height.



$V = 90$ IN.^{3} $V = 30$ IN.^{3}

Using the examples above, what do you notice about the volume of a cone compared to the volume of a cylinder with the same radius and the same height?

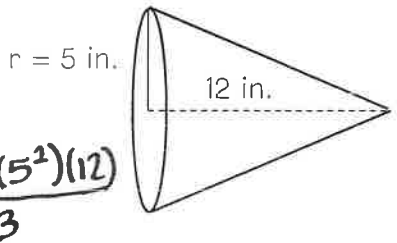
You should notice that the cone's volume is 1/3 of the cylinder's volume

VOLUME OF CONES

- The volume of a cone will always be 1/3 the volume of a cylinder with the same height and radius.
- The formula for the volume of a cone is $\frac{1}{3}\pi r^2 h$, or $\frac{\pi r^2 h}{3}$. ← This is easier to do with a calculator
- Since the base of a cone is a circle, the area of the base is found by using πr^2.

Find the volume of each cone below. Use 3.14 for π. Round to nearest tenth

1.



$V = \frac{3.14(5^2)(12)}{3}$

$V = \frac{942}{3}$

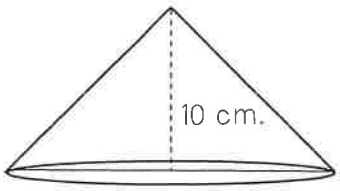
$V = 314$

Formula: $V = \frac{\pi r^2 h}{3}$ ← ÷

Plug in values: $3.14(5^2)(12) / 3$

Volume: $314 in^3$

2.



d = 22 cm. ← need to cut in half to get radius

Formula: $\frac{\pi r^2 h}{3}$

Plug in values: $3.14(11^2)(10) / 3$

Volume: $1266.5 cm^3$

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Volume of Cones

Name_____

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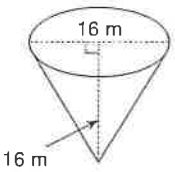
Use 3.14 for π

Show work for each problem by plugging values into formula

Find the volume of each figure. Round your answers to the nearest tenth, if necessary.

1)



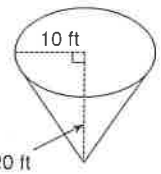
$V = \frac{\pi r^2 h}{3}$

$V = \frac{3.14(8^2)16}{3}$

$V = 1071.8\ m^3$

Show this work for each problem

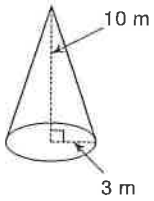
2)



$V = \frac{3.14(10^2)20}{3}$

$V = 2093.3\ ft^3$

3)



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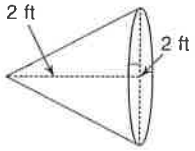

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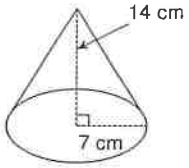

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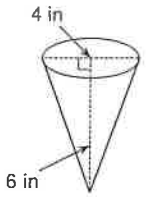

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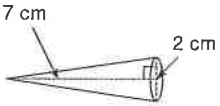

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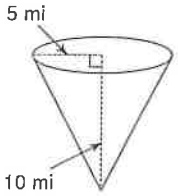

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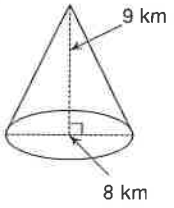

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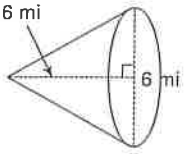

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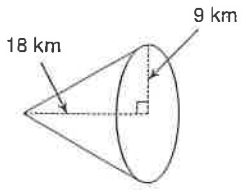

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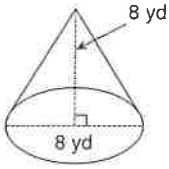

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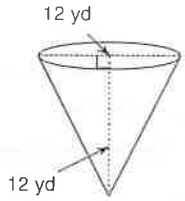
13)



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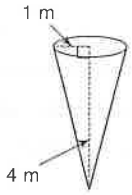

15)

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Unit: Volume
Homework 2

Day 16

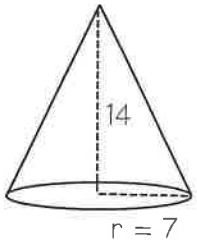
Name _____

Date _____ Pd _____

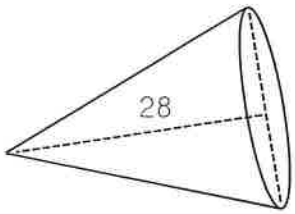
VOLUME OF CONES

Find the volume of each cone. Use 3.14 for π and round answers to the nearest tenth. Match each answer to a letter below to help you solve the riddle.

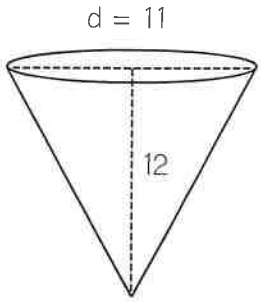
1.



2.



3.



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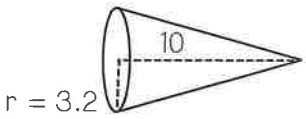
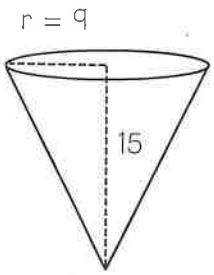


5.



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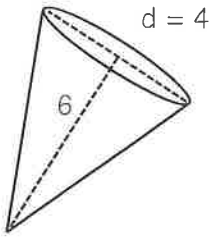

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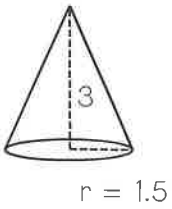

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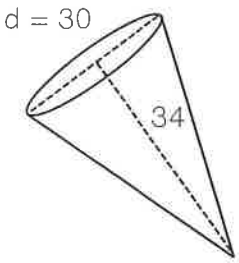
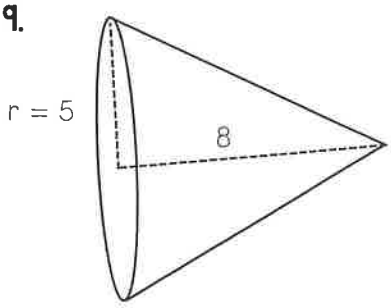


9.



G 107.2 u^3	**D** 1271.7 u^3	**O** 623 u^3	**T** 379.9 u^3	**E** 7.1 u^3	**A** 25.1 u^3
E 4,220.2 u^3	**S** 718 u^3	**H** 209.3 u^3	**U** 21.3 u^3	**P** 321.6 u^3	**I** 8,007 u^3

WHY WOULD A PRISM BEAT A SPHERE IN A COMPETITION?

___	___	___	___	___	___	___	___	___	___	___	___	___
8	3	9	6	1	3	9	2	7	5	4	2	

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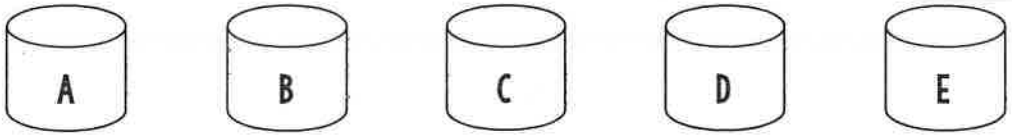
Remember, if a cylinder and a cone have the same radius and height, the volume of the cone will be 1/3 the volume of the cylinder.

* 3. The volume of several cylinders is shown below. (Note: cylinders are not drawn to scale.)



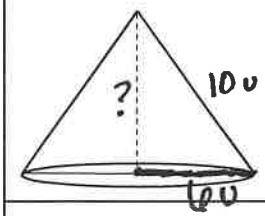
452.16 u^3 39.25 u^3 401.92 u^3 100.48 u^3 113.04 u^3

Use the dimensions in the table below to find the volume of each cone. Then, under the "cylinder" column, record the letter of the cylinder above that could have the same height and the same radius as the cone. Not all of the cylinders will be used.

DIMENSIONS OF CONE	VOLUME OF CONE	CYLINDER
Radius: 8 Height: 2	$\frac{3.14(8^2)2}{3} = \frac{401.92}{3} = 133.97u^3$	C
Diameter: 6 Height: 4		
Radius: 2.5 Height: 2		

challenge * Use your knowledge of the formula for volumes of cones to answer the questions below.

4. The cone below has a diameter of 12 units and a slant height of 10 units. Find the volume of the cone.



You will need to do Pythagorean Theorem to find height first.

5. Isabella constructed a cylindrical vase that has a volume of 63 cubic centimeters. Jason constructed a cone that had the same height and the same radius as Isabella's cylinder. What is the volume of Jason's cone?

Volume of the cone = $\frac{\text{Volume of cylinder}}{3}$

6. A cone has a volume of 300 $units^3$, and a cylinder has a volume of 100 $units^3$. Is it possible that the cylinder and the cone have the same height and the same radius? Why or why not?

7. A cone has a volume of 942 cubic inches and a height of 9 inches. What is the radius of the cone?

① $942 = \frac{3.14r^2(9)}{3}$ (3)

② $\frac{2826}{9} = \frac{3.14r^2(9)}{9}$ ÷

③ $314 = 3.14r^2$ Finish from here

Summarize today's lesson:

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Day 1/17

Unit: Volume
Student Handout 4

Notes

Name _____

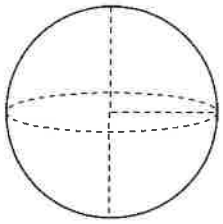
Date _____ Pd _____

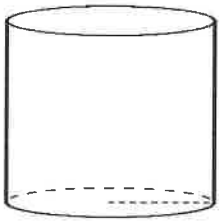
VOLUME OF SPHERES

VOLUME OF SPHERES

- The volume of a sphere can be found by using the formula $4/3\,\pi r^3$.
- Half of a sphere is called a hemisphere.

If a cylinder and a sphere have the same radius and the same height (the height of the sphere would be $2r$), then the sphere will have $2/3$ the volume of the cylinder. Use this fact to help you see how the formula for the volume of spheres was derived in the table below.





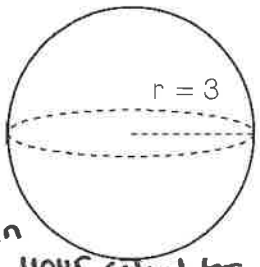
1. Formula for volume of a cylinder	$\pi r^2 h$
2. Replace "h" with "2r"	$\pi r^2 (2r)$
3. Multiply the formula by $\frac{2}{3}$	$\frac{2}{3}\pi r^2 (2r)$
4. Simplify	$4/3\,\pi r^3$

$2/3 \cdot 2 = 4/3$

$r^2 \cdot r = r^3$

Find the volume of each sphere and use 3.14 for π.

1.



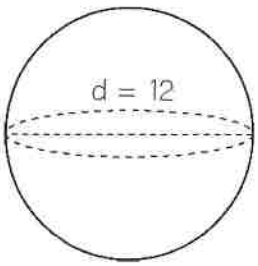
Type in your calculator as $4 \div 3$

Formula: $4/3\,\pi r^3$

Plug in values: $4/3(3.14)(3^3)$

Volume: $113.04\ u^3$

2.

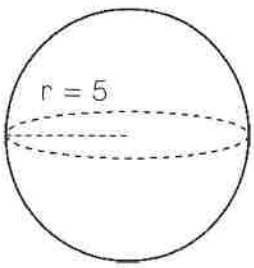


Formula: $4/3\,\pi r^3$

Plug in values: $4/3(3.14)(6^3)$

Volume: $904.32\ u^3$

3.



Formula: $4/3\,\pi r^3$

Plug in values: $4/3(3.14)(5^3)$

Volume: $523.\overline{3}\ u^3$

Should have a "x^3" button, if not, do $3 \cdot 3 \cdot 3 = 27$

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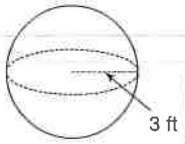
Kuta Software - Infinite Geometry Name_____

Spheres Use 3.14 for π Date_____ Period____

Find the volume of each figure. Round your answers to the nearest tenth, if necessary.

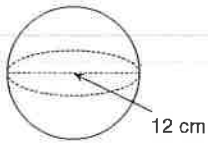
1) 

$V = 4/3\,\pi r^3$

$V = 4/3\,(3.14)(3^3)$

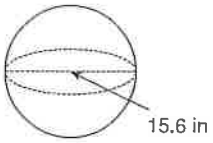
$V = 113.04u^3$

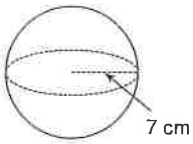
Show work like this for each problem

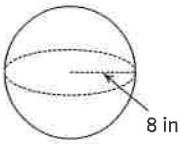
2) 

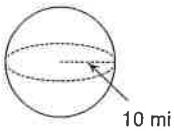
$V = 4/3\,(3.14)(6^3)$

$V = 904.32\,u^3$

3) 

4) 

5) 

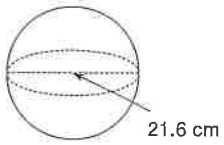
6) 

7) A sphere with a diameter of 6.2 in.

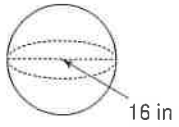
8) A sphere with a radius of 10 mi.

Find the volume of each figure. Round your answers to the nearest tenth, if necessary.

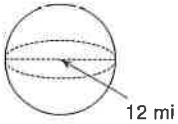
9)



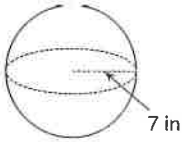
10)



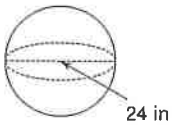
11)



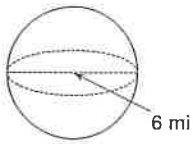
12)



13)



14)



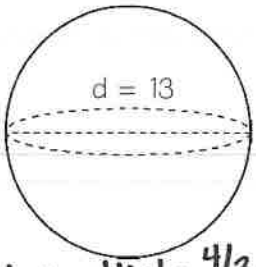
15) A sphere with a diameter of 2 m.

16) A sphere with a diameter of 10 ft.

Day 18

In 4-6, find the volume of each sphere, and leave your solutions in terms of π.

4.



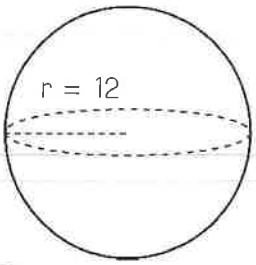
* Just multiply $4/3$ and r^3 and leave π

Formula: $4/3\,\pi r^3$

Plug in values: $4/3\,\pi(6.5)^3$

Volume: $366.17\,\pi\,u^3$

5.

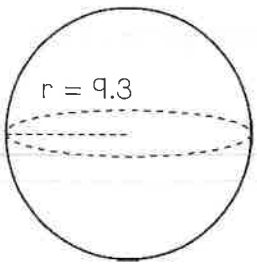


Formula: $4/3\,\pi r^3$

Plug in values: $4/3\,\pi(12^3)$

Volume: $2304\,\pi\,u^3$

6.



Formula: _____

Plug in values: _____

Volume: _____

Use the formula for the volume of spheres to help you answer each question below.

7. A hemisphere has a radius of 7 inches. Find the volume of the hemisphere. Find volume as normal then divide by 2.

_____

Example

8. A sphere has a volume of 288π in^3. Find the radius of the sphere.

$$\frac{288\pi}{\pi} = \frac{4/3\,\pi r^3}{\pi} \div$$

$$\frac{288}{4/3} = \frac{4/3\,r^3}{4/3} \div$$

$216 = r^3$ what # cubed is 216?

6 in

9. A sphere has a volume of 972π in^3. Find the radius of the sphere.

$972\pi = 4/3\,\pi r^3$

_____

10. A cylinder, a cone and a sphere all have a radius of 3 feet and a height of 6 feet. Find the volume of each and record it in the table.

$V = \pi r^2 h$

CYLINDER	$V = \frac{\pi r^2 h}{3}$ CONE	SPHERE

$V = 4/3\,\pi r^3$

a. What is the ratio of the volume of the sphere to the volume of the cylinder?

b. How does the volume of the sphere compare to the cone?

c. List the figures in order of the greatest capacity to the least capacity.

Summarize today's lesson:

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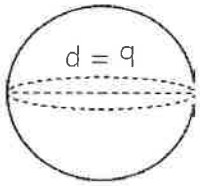
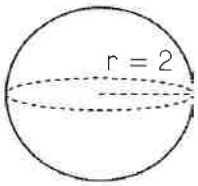
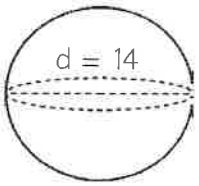
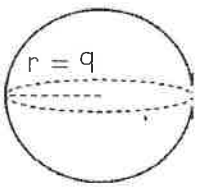
Unit: Volume
Homework 3

Name _____

Date _____ Pd _____

VOLUME OF SPHERES

Part I: Draw a line connecting each sphere to its volume in terms of π and rounded to the nearest tenth. (Not all of the values will be used.)

SPHERE	VOLUME (IN TERMS OF PI)	VOLUME (NEAREST TENTH)
1. 	$457.\overline{3}\pi$ units^3	3,052.1 units^3
	121.5π units^3	67 units^3
2. 	$21.\overline{3}\pi$ units^3	33.5 units^3
3. 	$10.\overline{6}\pi$ units^3	381.5 units^3
	972π units^3	10,052.2 units^3
4. 	$3,201.\overline{3}\pi$ units^3	1,436 units^3

Part II: Answer each question below.

5. Find the volume of a hemisphere that has a radius of 8 centimeters. Round to the nearest tenth. Find volume as normal then divide by 2.

_____

6. Find the volume of a hemisphere that has a diameter of 48 inches. Leave your answer in terms of π.

_____

7. A sphere has a volume of 36π in^3. Find the radius of the sphere.

$36\pi = 4/3\,\pi r^3$

_____

Look at #8 on previous page

8. A sphere has a volume of $2,304\pi$ mm^3. Find the diameter of the sphere.

_____

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NAME: _____ DATE: _____ CLASS: _____

Day 19

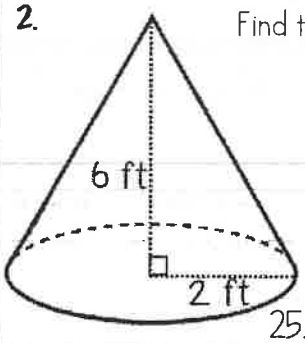
VOLUME Practice

Directions: Round answers to the nearest tenth. Show ALL steps! Color the problem number with its color in the picture.

1. What is the radius of a cylinder with a diameter of 18 cm?

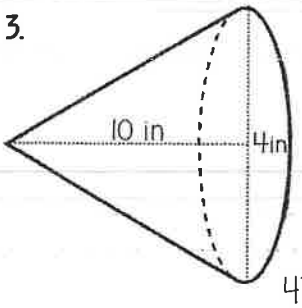
9 cm - Orange
6 cm - Purple

2. Find the volume.



3 ft.^{3} - Green
25.1 ft.^{3} - Lt. Blue

3. Find the volume.



41.9 in.^{3} - Green
125.6 in.^{3} - Pink

4. What is the volume of a cylinder with a radius of 4 yards and a height of 6 yards?

150.72 yd.^{3} - Yellow
301.4 yd.^{3} - Red

5. What is the volume of a beach ball with a diameter of 18 inches?

3,052.1 in.^{3} - Orange
339.1 in.^{3} - Yellow

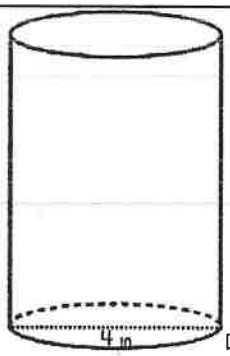
6. How much ice cream can fit in a chocolate cone with a height of 7 inches and a diameter of 4 inches?

87.92 in.^{3} - Dark Blue
29.3 in.^{3} - Yellow

7. What is the exact volume of a cylinder with a radius of 7 inches and a height of 20 inches?

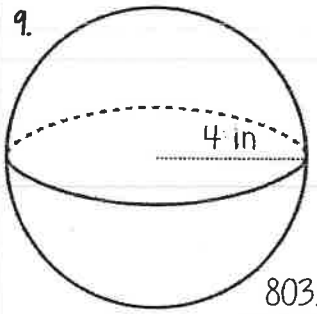
3,077.2 in.^{3} - Lt. Blue
879.2 in.^{3} - Yellow

8. Find the volume.



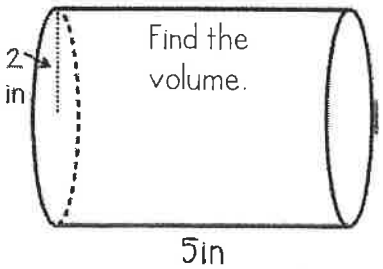
125.6 in.^{3} - Red
502.4 in.^{3} - Yellow

9. Find the volume.



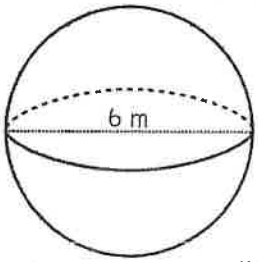
803.84 in.^{3} - Red
267.9 in.^{3} - Dk. Blue

10. Find the volume.



62.8 in.^{3} - Red
157 in.^{3} - Green

11. Find the volume.



339.1 m.^{3} - Blue
113.04 m.^{3} - Green

12. A bouncy ball has an exact volume of 36π cm^3. What is the radius?

3 cm. - Dk. Blue
27 cm. - Yellow

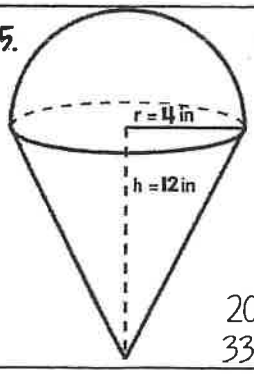
13. An orange cone has an exact volume of 120π ft^3. What is the height of the cone if the radius is 6 ft.?

5 ft. - Orange
10 ft. - Yellow

14. What is the total volume of juice in a six-pack if each can is 6 inches tall and has a diameter of 3 inches?

42.39 in.^{3} - Dk. Blue
254.3 in.^{3} - Lt. Blue

15. Find the total volume.



200.96 in.^{3} - Yellow
334.86 in.^{3} - Green

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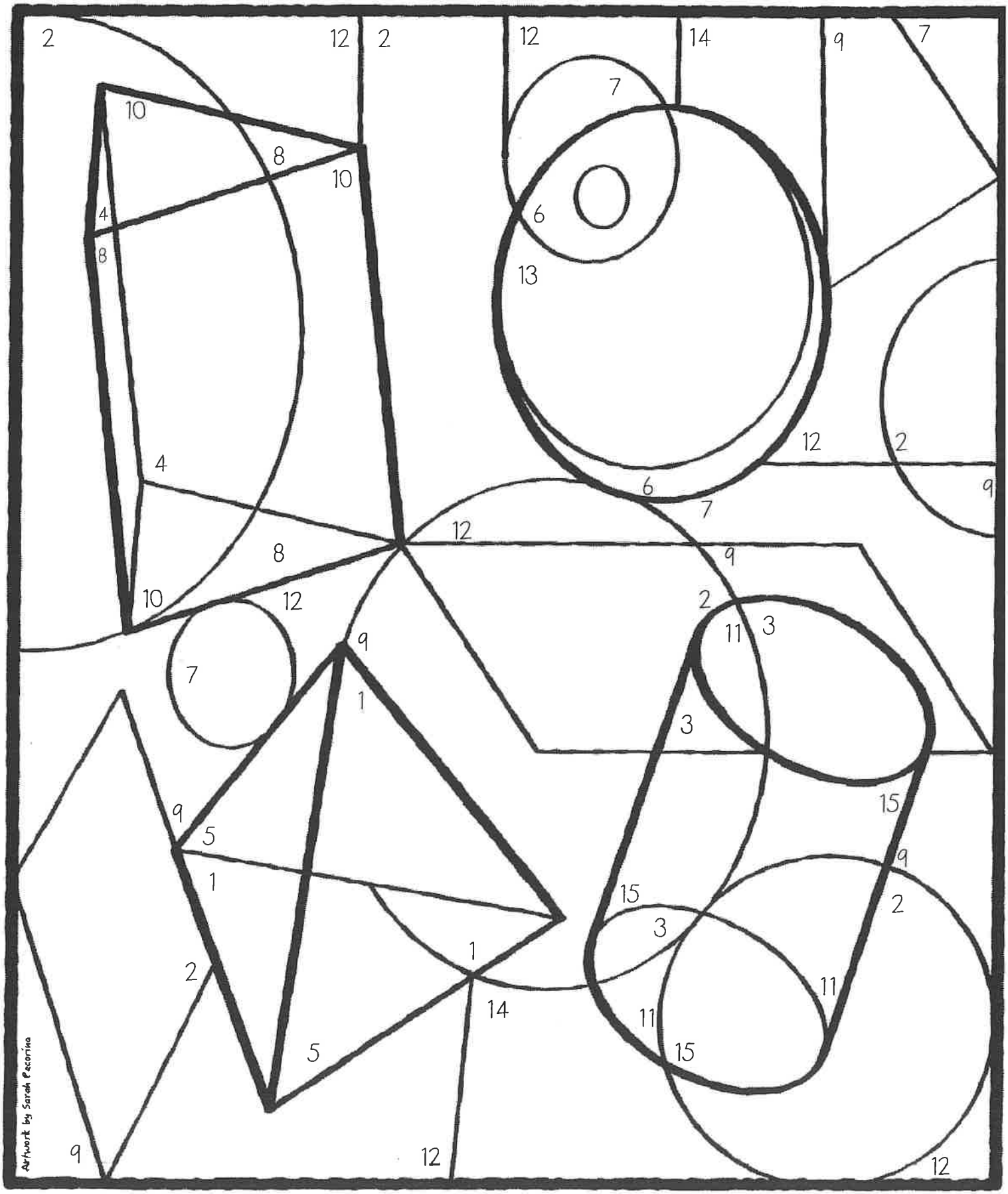
VOLUME Practice



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QUIZIZZ Day 20

Volume of Cylinders, Cones, and Spheres

15 Questions

NAME : _____

CLASS : _____

DATE : _____

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

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

Sphere: $V = \frac{4}{3}\pi r^3$

1. Emily needs to make party hats in the shape of a cone. She wants the hat to have a radius of 6 inches and a height of 15 inches. What is the volume of the party hat?

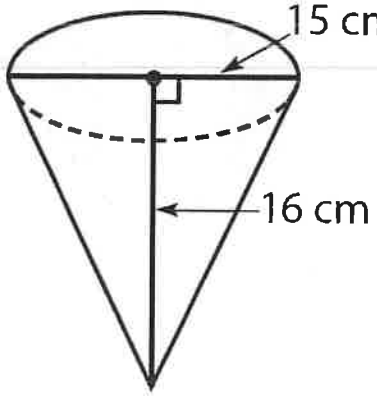
☐ a) 565.2 in^3 ☐ b) 94.2 in^3

☐ c) 2260.8 in^3 ☐ d) 188.4 in^3

2. A cylindrical can of corn has a radius of 2.5 inches and a height of 5 inches. What is the volume of the can?

☐ a) 39.3 in^3 ☐ b) 98.1 in^3

☐ c) 392.5 in^3 ☐ d) 78.5 in^3

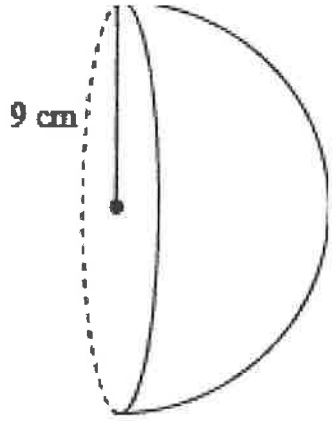
3. 

Determine the volume of the cone.

☐ a) 125.6 cm^3 ☐ b) 3768 cm^3

☐ c) 942 cm^3 ☐ d) 251.2 cm^3

4. Determine the volume of the hemisphere.



☐ a) 3052.08 cm^3 ☐ b) 339.12 cm^3

☐ c) 1526.04 cm^3 ☐ d) 127.17 cm^3

5. A jar of jam has a diameter of 6 cm and a height of 8 cm. If the jar is half full, then what is the volume of the jam in the jar?

☐ a) 452.16 cm^3 ☐ b) 904.32 cm^3

☐ c) 226.08 cm^3 ☐ d) 113.04 cm^3

6. Joyce has a cone shaped planter hanging on her porch. The planter has a radius of 6.8 inches and a height of 12.2 inches. What is the total amount of soil the planter can hold?

☐ a) 590.5 in^3 ☐ b) 1771.4 in^3

☐ c) 145.2 in^3 ☐ d) 196.8 in^3

7. What is this formula used to find?

$V=\pi r^2 h$

☐ a) The volume of a cylinder ☐ b) The volume of a cone

☐ c) The volume of a sphere ☐ d) The area of a circle

8. What is this formula used to find?

$V=4/3\pi r^3$

☐ a) The volume of a cylinder ☐ b) The volume of a cone

☐ c) The volume of a sphere ☐ d) The area of a circle

9. What is this formula used to find?

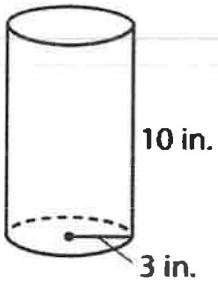
$A=\pi r^2$

☐ a) The volume of a cylinder ☐ b) The volume of a cone

☐ c) The volume of a sphere ☐ d) The area of a circle

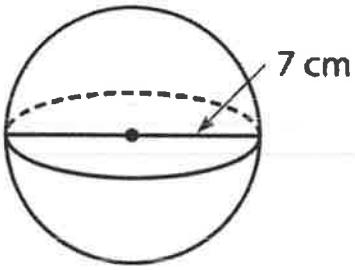
10. What is the relationship between the volume of a cone and cylinder when they both have the same radius and height?

- ☐ a) The cylinder is 1/3 the volume of the cone.
- ☐ b) The cone is 1/3 the volume of the cylinder.
- ☐ c) They have the same volume.
- ☐ d) Their volumes are not related at all.

11. 

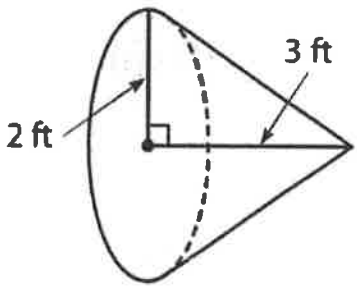
Find the volume to the nearest tenth using 3.14 instead of Pi.

- ☐ a) 282.6 in^3
- ☐ b) 94.2 in^3
- ☐ c) 235.5 in^3
- ☐ d) 78.5 in^3

12. 

Find the volume to the nearest hundredth using 3.14 instead of Pi.

- ☐ a) 179.50 cm^3
- ☐ b) 205.15 cm^3
- ☐ c) 51.29 cm^3
- ☐ d) 1436.03 cm^3

13. 

Find the volume to the nearest hundredth using 3.14 instead of Pi.

- ☐ a) 12.56 ft^3
- ☐ b) 37.68 ft^3
- ☐ c) 18.84 ft^3
- ☐ d) 6.28 ft^3

Scan with phone camera to get answers.

You still need to know this content, so please try the problems first ☺