

SPIRAL DAY #2

Just Solutions

So far we have studied formulas----Area, Surface Area and Volume of:

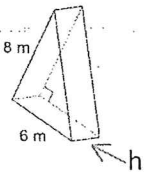
A.) $b \cdot h$	E.) 2 bases + rectangles	I.) Area of Base + $n(\text{triangles})$	M.) $n \cdot \frac{1}{2} r \cdot r \cdot \sin\theta$
B.) πr^2	F.) $\frac{1}{2} a \cdot b \cdot \sin\theta$	J.) $2\pi r^2 + 2\pi rh$	N.) $\frac{4}{3}\pi r^3$
C.) $\pi r^2 + \pi rl$	G.) $B \cdot h$ (use twice)	K.) $\frac{1}{2} S \cdot S \cdot \sin 60^\circ$	O.) $4\pi r^2$
D.) $\frac{1}{2} b \cdot h$	H.) $\frac{1}{3} B \cdot h$ (use twice)	L.) $\frac{1}{2}(b_1 + b_2)h$	

Match the formulas with the below. Use only once unless it says you can use more than once.

Area:	Surface Area:	Volume:
<u>F</u> Triangle given SAS	<u>E</u> Prisms	<u>G</u> Prisms
<u>K</u> Equilateral Triangle	<u>J</u> Cylinders	<u>G</u> Cylinders
<u>M</u> Regular Polygon	<u>I</u> Pyramids	<u>H</u> Pyramids
<u>L</u> Trapezoid	<u>C</u> Cones	<u>H</u> Cones
<u>D</u> Triangle	<u>O</u> Spheres	<u>N</u> Spheres
<u>A</u> Parallelogram		
<u>B</u> Circle		

Examples: Find the missing dimension. Round to the nearest tenth.

1. The volume of a triangular prism is 96m^3 . The prism has a right triangle base with legs of 8 meters and 6 meters. Find the height of the prism.

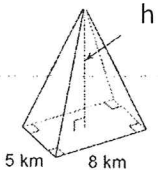


① $V = B \cdot h$
 ③ $96 = \frac{1}{2} \cdot 6 \cdot 8 \cdot h$
 $96 = 24 \cdot h$
 $\frac{96}{24} = \frac{24 \cdot h}{24}$

② area of Base
 $B = \frac{1}{2} \cdot 6 \cdot 8$

$h = 4\text{m}$

2. The volume of the rectangular pyramid has a volume of about 146.67 km^3 . The base of the pyramid is a rectangle that is 5 km by 8 km. Find the height of the pyramid.



① $V = \frac{1}{3} B \cdot h$
 $146.67 = \frac{1}{3} \cdot 5 \cdot 8 \cdot h$
 $146.67 = 13.3h$
 $\frac{146.67}{13.3} = \frac{13.3h}{13.3}$

② area of Base
 $B = 5 \times 8$

$h = 11.03\text{ km}$

3. The volume of a cylinder is 616π cubic meters and the height is 4 meters. Find the length of the diameter of the cylinder.

$V = B \cdot h$
 $616\pi = \pi r^2 \cdot 4$
 $\frac{616\pi}{4\pi} = \frac{\pi r^2}{4\pi}$
 $\sqrt{154} = r$
 $r = 12.4$

area of Base
 $B = \pi r^2$

$d = 24.8\text{m}$

4. The volume of a rectangular prism is 1152 cubic inches and the area of the base is 64 square inches. Find the height of the prism.

$$h = 18 \text{ in}$$

5. The surface area of a cone is $261.9\pi \text{ km}^2$. The cone has a diameter of 18 km. Find the slant height of the cone.

$$SA = \pi r^2 + \pi r l$$

$$261.9\pi = \pi 9^2 + \pi 9 l$$

$$261.9\pi = 81\pi + 9\pi l$$

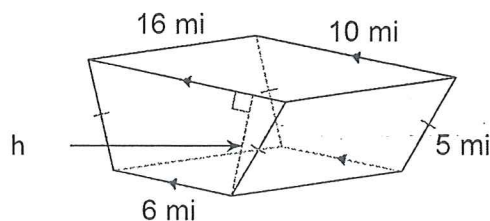
$$-81\pi \quad -81\pi$$

$$r = 9$$

$$\frac{180.9\pi}{9\pi} = \frac{9\pi l}{9\pi}$$

$$20.1 \text{ km} = l$$

6. The surface area of the trapezoidal prism is 489.6 mi^2 . Find the missing length below.



$$h = 4.6 \text{ in}$$

Refer to the similar prisms for the following questions.

Final exam question

7. Find the scale factor of the two prisms from larger to smaller.

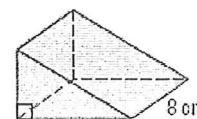
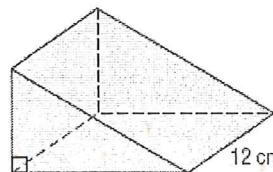
$$12:8 \quad SF = 3:2$$

8. Find the ratio of the surface areas.

$$AR = SLR^2 \therefore 9:4$$

9. Find the ratio of the volumes.

$$VR = SLR^3 \therefore 27:8$$



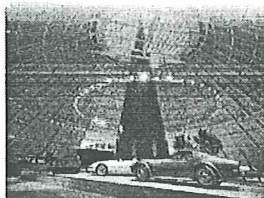
10. Suppose the volume of the larger prisms is 810 cubic centimeters. Find the volume of the smaller.

$$\text{Volume of smaller} = 240 \text{ cm}^3$$

11. **AQUARIUM** The New England Aquarium in Boston, Massachusetts, has one of the world's largest cylindrical tanks. The Giant Ocean Tank holds approximately 200,000 gallons and is 23 feet deep. If it takes about $7\frac{1}{2}$ gallons of water to fill a cubic foot, what is the radius of the Giant Ocean Tank?

$$r = 19.2 \text{ ft}$$

12. **MUSEUMS** The skydome of the National Corvette Museum in Bowling Green, Kentucky, is a conical building. If the height is 100 feet and the area of the base is about 15,400 square feet, find the volume of air that the heating and cooling systems would have to accommodate. Round to the nearest tenth.

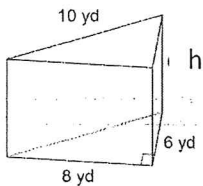


$$V = 513,333.\bar{3} \text{ ft}^3$$

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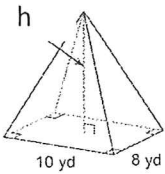
SPIRAL DAY #2 HOMEWORK

1. The volume of a triangular prism is 144 yd^3 . The prism has a right triangle base with legs of 8 meters and 6 meters. Find the height of the prism.



$$h = 6 \text{ yd}$$

2. The volume of the rectangular pyramid has a volume of about 266.67 yd^3 . The base of the pyramid is a rectangle that is 10 km by 8 km. Find the height of the pyramid.



$$h = 10 \text{ yd}$$

3. The volume of a cylinder is 7875π cubic meters and the radius is 15 meters. Find the height the cylinder.

$$h = 35 \text{ m}$$

4. The volume of a rectangular pyramid is 84 in^3 and the area of the base is 12 in^2 . Find the height of the pyramid.

$$h = 2 \text{ in}$$

5. The surface area of a cone is $250\pi \text{ km}^2$. The cone has a diameter of 20 km. Find the slant height of the cone.

$$l = 15 \text{ km}$$

Refer to the similar prisms for the following questions.

Final Exam questions!

6. Find the scale factor of the two prisms from larger to smaller.

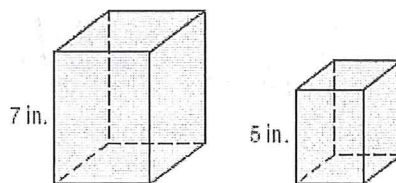
$$7:5$$

7. Find the ratio of the surface areas.

$$49:25$$

8. Find the ratio of the volumes.

$$343:125$$



9. Suppose the volume of the smaller prisms is 60 cubic inches. Find the volume of the larger.

$$\text{larger volume is } 164.64 \text{ in}^3$$

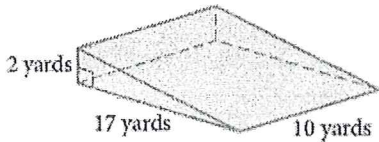
10. Mount Rainier, which is an active volcano in Washington, is 4392 meters tall and about 18,000 meters across its base. Assume that it can be modeled by a cone. Find the volume of rock it would take to fill Mt. Rainier.

$$372.5 \text{ km}$$

11. The Great Pyramid of Khufu is a square pyramid. The lengths of the sides of the base are 755 feet. The original height was 481 feet. The current height is 449 feet. What volume of material has been lost?

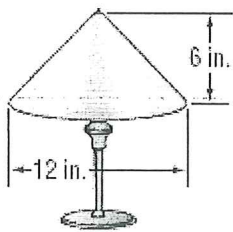
Lost
 6080246.663 ft^3

12. *Application* A contractor needs to build a ramp, as shown at right, from the street to the front of a garage door. How many cubic yards of fill will she need?



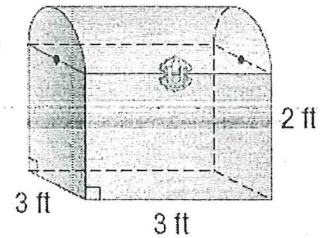
$$V = 170 \text{ yd}^3$$

13. **LAMPS** Diego has a conical lampshade with an altitude of 6 inches and a diameter of 12 inches. Find the lateral area of the lampshade.



$$36\pi\sqrt{2} \text{ in}^2$$

14. **BUILDING** Manny is building a blanket chest for his sister. His design is a composite of a square prism and half of a cylinder. What is the volume of the hope chest?



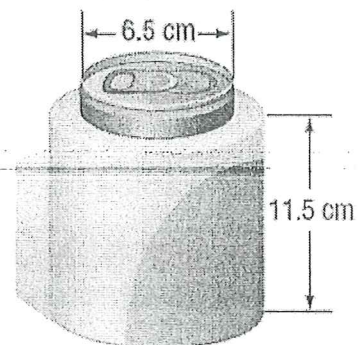
$$28.6 \text{ ft}^3$$

15. **PARTY HATS** Shelley plans to make eight conical party hats for her niece's birthday. If each hat is to be 18 inches tall and the bases of each to be 22 inches in circumference, how much material will she use to make the hats?

$r = 3.5$
 $l = 18.3$ *show now to get this!!*
 1609.8 in^2

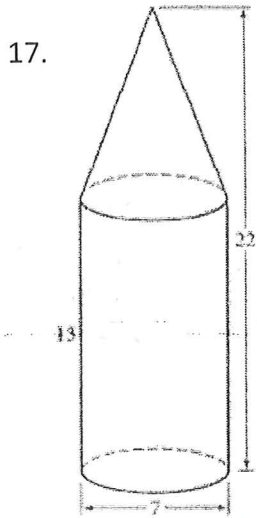
16. If a can is 12 cm tall and fits in the holder which has 1 cm thickness, what is the volume of the entire solid.

~~524.6 cm^3~~
 $V = 669.2 \text{ cm}^3$

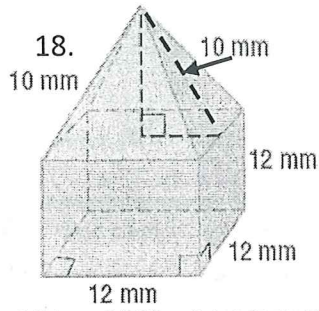


Composite Figures Practice

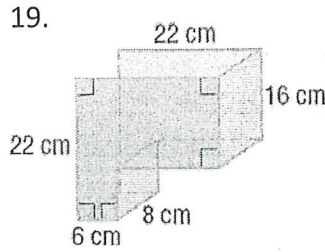
Find the surface area and volume for the following solids. Round to the nearest tenth if needed.



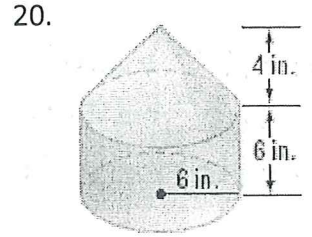
$SA = 288.1 \text{ unit}^2$
 $V = 615.8 \text{ unit}^3$



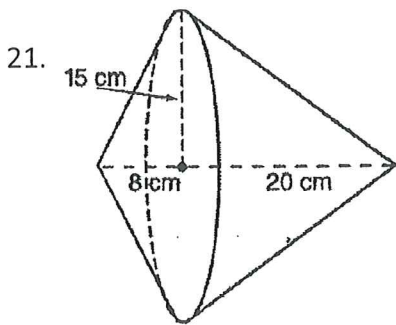
$SA = 960 \text{ mm}^2$
 $V = 2112 \text{ mm}^3$



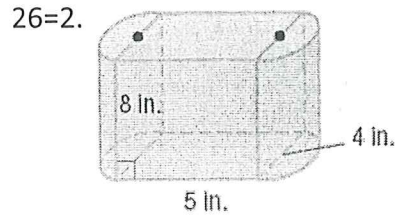
$SA = 1480 \text{ cm}^2$
 $V = 3104 \text{ cm}^3$



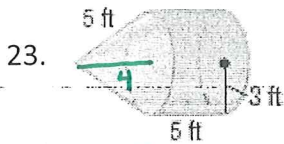
~~$SA = 351.2 \text{ in}^2$~~
 $V = 829.4 \text{ in}^3$
 $SA = 475.2 \text{ in}^2$



$SA = 1979.2 \text{ cm}^2$
 $V = 6597.3 \text{ cm}^3$



$SA = 245.7 \text{ in}^2$
 $V = 260.5 \text{ in}^3$



$$SA = \pi r^2 + 2\pi rh + \pi r l$$

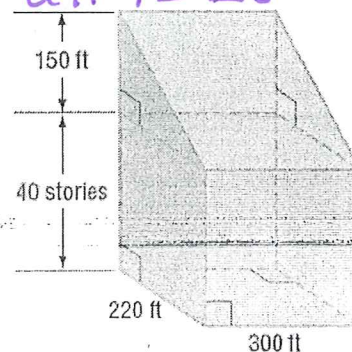
$$SA = \pi 5^2 + 2\pi 5 \cdot 3 + \pi 5 \cdot 5$$

$$SA = 169.6 \text{ ft}^2$$

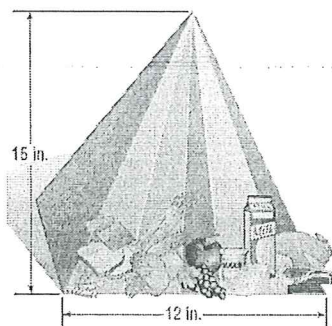
$$V = 179.1 \text{ ft}^3$$

25. **CHALLENGE** A 40-story building is a rectangular prism with a length of 300 feet and a width of 220 feet. On top of the rectangular prism is a triangular prism the base of which has a height of 150 feet and a base of 220 feet. If each story is 11 feet, find the volume of the building.

$$V = 36,894,000 \text{ ft}^3$$

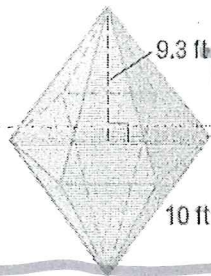


26. **NUTRITION** Rebeca is making a plaster model of the Food Guide Pyramid for a class presentation. The model is a square pyramid with a base edge of 12 inches and a height of 15 inches. Find the volume of plaster needed to make the model.



$$V = 2160 \text{ in}^3$$

24.



$$V = 1610.8 \text{ ft}^3$$

$SA = 762 \text{ ft}^2$ - hint
You must 1) Find apothem w/ special RTΔs, then slant using pyth. then take SA of all 12 Δs faces.