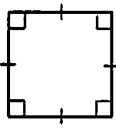
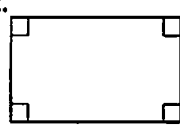
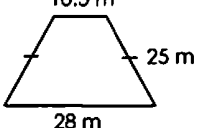
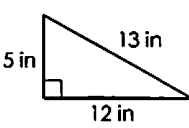
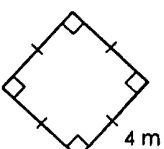
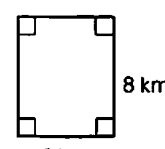
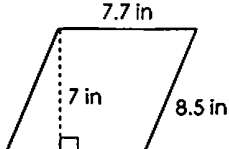
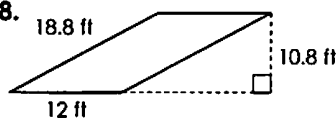
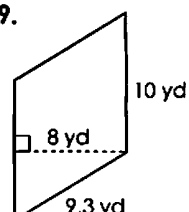

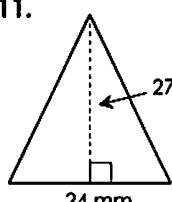
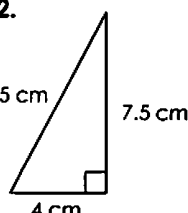
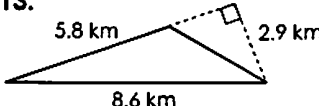
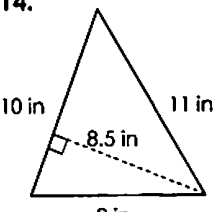


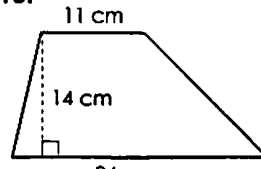
Name:	Date:
Topic:	Class:

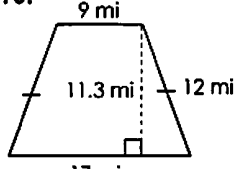
Main Ideas/Questions	Notes/Examples	
<b>PERIMETER</b>	<p>the sum of the side measures around a two-dimensional figure.</p> <p>Find the perimeter of each shape:</p>	
	<p>1.  <math>4(7) = \boxed{28 \text{ cm}}</math></p>	<p>2.  <math>2(15.6) + 2(28.1) = \boxed{87.4 \text{ ft}}</math></p>
	<p>3.  <math>10.5 + 28 + 2(25) = \boxed{88.5 \text{ m}}</math></p>	<p>4.  <math>= \boxed{30 \text{ in}}</math></p>
<b>AREA</b>  <div>Area of Square <math>A = s^2</math> Area of a Rectangle <math>A = l \cdot w</math></div>  <div>Area of a Parallelogram <math>A = b \cdot h</math></div>          <div>Area of a Triangle <math>A = \frac{1}{2} b \cdot h</math></div>	<p>The amount of space occupied by a two-dimensional figure.</p> <p>Find the area of each shape:</p>	
	<p>5.  <math>A = 4^2 = \boxed{16 \text{ m}^2}</math></p>	<p>6.  <math>A = 8(5) = \boxed{40 \text{ km}^2}</math></p>
	<p>7.  <math>A = 7.7(7) = \boxed{53.9 \text{ in}^2}</math></p>	<p>8.  <math>A = 12(10.8) = \boxed{129.6 \text{ ft}^2}</math></p>
	<p>9.  <math>A = 8(10) = \boxed{80 \text{ yd}^2}</math></p>	<p>10.  <math>A = 4(11.5) = \boxed{46 \text{ m}^2}</math></p>
	<p>11.  <math>A = \frac{1}{2}(24)(27) = \boxed{324 \text{ mm}^2}</math></p>	<p>12.  <math>A = \frac{1}{2}(4)(7.5) = \boxed{15 \text{ cm}^2}</math></p>

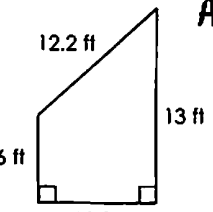
Area of a Trapezoid  
 $A = \frac{1}{2} h (b_1 + b_2)$

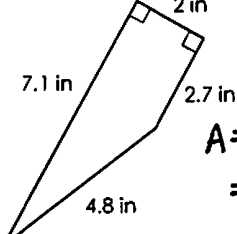
13.   
 $A = \frac{1}{2} (5.8)(2.9)$   
 $= 8.41 \text{ km}^2$

14.   
 $A = \frac{1}{2} (10)(8.5)$   
 $= 42.5 \text{ in}^2$

15.   
 $A = \frac{1}{2} (14)(11 + 24)$   
 $= 245 \text{ cm}^2$

16.   
 $A = \frac{1}{2} (11.3)(9 + 17)$   
 $= 146.9 \text{ mi}^2$

17.   
 $A = \frac{1}{2} (10)(6 + 13)$   
 $= 95 \text{ ft}^2$

18.   
 $A = \frac{1}{2} (2)(7.1 + 2.7)$   
 $= 9.8 \text{ in}^2$

## GOING BACKWARDS

19. Find the base of a parallelogram with a height of 10.5 feet and an area of 189 ft<sup>2</sup>.  
 $A = b \cdot h$   
 $189 = b \cdot 10.5$   
 $\frac{189}{10.5} = \frac{b \cdot 10.5}{10.5}$   
 $b = 18 \text{ ft}$

20. A triangle has an area of 220 square meters. Find its height if its base measures 20 meters.  
 $A = \frac{1}{2} b \cdot h$   
 $220 = \frac{1}{2} (20) \cdot h$   
 $\frac{220}{10} = \frac{10h}{10}$   
 $h = 22 \text{ m}$

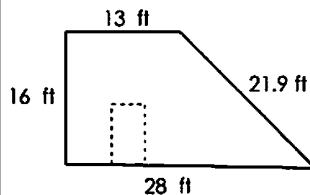
21. A trapezoid has an area of 27.5 cm<sup>2</sup>. What is the measure of the height if the bases measure 7 cm and 4 cm?  
 $A = \frac{1}{2} h (b_1 + b_2)$   
 $27.5 = \frac{1}{2} h (7 + 4)$   
 $27.5 = 5.5h$   
 $\frac{27.5}{5.5} = \frac{5.5h}{5.5}$   
 $h = 5 \text{ cm}$

22. Find the length of the second base of a trapezoid with one base measuring 8 inches, a height of 13 inches, and an area of 149.5 square inches.  
 $A = \frac{1}{2} h (b_1 + b_2)$   
 $149.5 = \frac{1}{2} (13)(b + 8)$   
 $149.5 = 6.5(b + 8)$   
 $23 = b + 8$   
 $b = 15 \text{ in}$

# PERIMETER & AREA Applications

**Directions:** Read each problem carefully and solve! Draw pictures when necessary.

- 1 A 7-foot by 3-foot doorway is to be cut into a trapezoid-shaped wall as shown below. Find the area of the wall with the door cut out.



$$A_{\text{Trap}} = \frac{1}{2} (16) (13 + 28) \\ = 328 \text{ ft}^2$$

$$A_{\text{Door}} = 7(3) = 21 \text{ ft}^2$$

$$328 - 21 = \boxed{307 \text{ ft}^2}$$

- 2 Mr. Brinkley has a triangular-shaped area for his horses with sides measuring 30 meters, 64 meters, and 87 meters. He would like to enclose this area with a fence. If the fencing comes in 2.5-meter sections, how many sections of fence will be needed?

$$P = 30 + 64 + 87 = 181 \text{ m}$$

$$\frac{181}{2.5} = 72.4$$

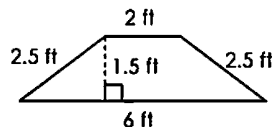
**73 Sections**

- 3 An Olympic-sized pool measures 50 meters by 25 meters. If a coach asked his swimmers to swim around the pool three times, how far will they swim?

$$P = 2(25) + 2(50) \\ = 150 \text{ m}$$

$$3(150) = \boxed{450 \text{ m}}$$

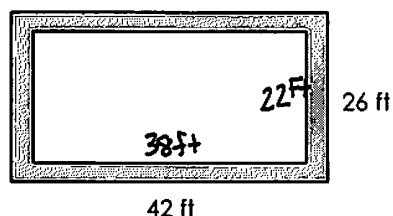
- 4 Mrs. Humphrey needs to replace a broken window on her house. The window is shaped like a trapezoid with dimensions shown below. If glass costs \$21.50 per square foot, how much will the replacement window cost?



$$A = \frac{1}{2} (1.5) (2 + 6) \\ = 6 \text{ ft}^2$$

$$6(21.5) = \boxed{\$129}$$

**Use for questions 5-6:** Plans for a rectangle-shaped garden will include a 2-foot wide cement walkway surrounding it, as shown in the picture below.



- 5 If concrete costs \$4.50 per square foot, how much will it cost to fill the walkway?

$$A_{\text{out}} = 42(26) = 1092$$

$$A_{\text{in}} = 38(22) = 836$$

$$\text{Sidewalk} = 1092 - 836 = 256$$

$$256(4.50) = \boxed{\$1152}$$

- 6 For the holiday season, lights will be strung along each side of the walkway. If one box of lights will cover 10 feet of walkway, how many boxes are needed?

$$P_{\text{out}} = 2(42) + 2(26) = 136$$

$$P_{\text{in}} = 2(38) + 2(22) = 120$$

$$\frac{256}{10} = 25.6$$

**26 boxes**

- 7 Mr. Marsh plans to tile the floor in his 6-foot by 8-foot front hall. If each tile is an 8-inch square, what is the minimum number of tiles needed to cover the floor?

$$6\text{ ft} = 72\text{ in}$$

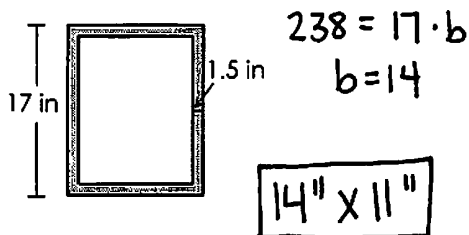
$$8\text{ ft} = 96\text{ in}$$

$$A = 72(96)$$

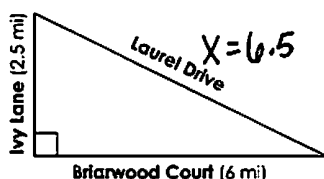
$$= 6912\text{ sq. in}$$

$$\frac{6912}{64} = \boxed{108\text{ tiles}}$$

- 8 The total area of a picture frame, including the glass and 1.5-inch wide wooden frame, is 238 square inches. If the frame is 17 inches tall, what are dimensions of the maximum picture size that will fit in the frame?



- 9 The intersections of three streets form a triangle as shown below. If Kelly decides to make this triangle her running route today, how far will she run?



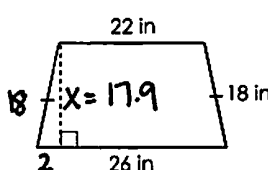
$$2.5^2 + 6^2 = X^2$$

$$42.25 = X^2$$

$$X = 6.5$$

$$\boxed{15\text{ mi}}$$

- 10 Mrs. Watson has 30 desks in her math class, each shaped like the trapezoid shown below. She plans to cover each one with bulletin board paper for a project. What is the minimum amount of paper she will need?



$$2^2 + X^2 = 18^2$$

$$4 + X^2 = 324$$

$$X^2 = 320$$

$$X = 17.9$$

$$A = \frac{1}{2}(17.9)(22 + 26)$$

$$= 429.6\text{ in}^2$$

$$\boxed{12888\text{ in}^2}$$

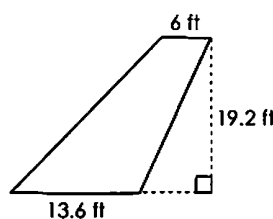
- 11 One of the display boards at the Dallas Cowboys' stadium has a screen size of 11,393 square feet. If the width of the board is 160 feet, find its height.

$$11,393 = 160 \cdot h$$

$$71.2 = h$$

$$\boxed{71.2\text{ ft}}$$

- 12 The vertical tail on an airplane is shaped like a trapezoid, with dimensions shown below. If each side of the tail is to be painted, and one can of paint covers 150 square feet, how many cans of paint are needed?



$$A = \frac{1}{2}(19.2)(6 + 13.6)$$

$$= 188.16\text{ ft}^2$$

$$\frac{376.32}{150} = 2.5$$

$$\boxed{3\text{ cans}}$$

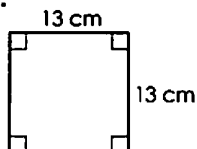


Name: \_\_\_\_\_

Unit 8: Measurement (Area and Volume)

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 1: Perimeter and Area

**\*\* This is a 2-page document! \*\*****Directions:** Find the perimeter and area of each figure.1.  $P = 4(13)$ 

$= 52$

$$A = 13^2$$

$$= 169$$

$P = 52 \text{ cm}$

$A = 169 \text{ cm}^2$

2.  $P = 2(15) + 2(23)$ 

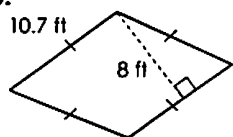
$= 76$

$$A = 15(23)$$

$$= 345$$

$P = 76 \text{ in}$

$A = 345 \text{ in}^2$

3.  $P = 4(10.7)$ 

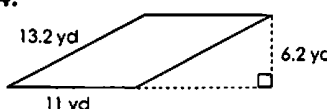
$= 42.8$

$$A = 10.7(8)$$

$$= 85.6$$

$P = 42.8 \text{ ft}$

$A = 85.6 \text{ ft}^2$

4.  $P = 2(11) + 2(13.2)$ 

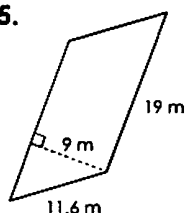
$= 48.4$

$$A = 11(6.2)$$

$$= 68.2$$

$P = 48.4 \text{ yd}$

$A = 68.2 \text{ yd}^2$

5.  $P = 2(11.6) + 2(19)$ 

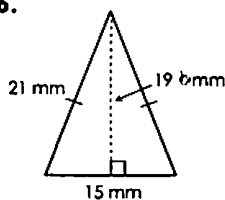
$= 61.2$

$$A = 19(9)$$

$$= 171$$

$P = 61.2 \text{ m}$

$A = 171 \text{ m}^2$

6.  $P = 2(21) + 15$ 

$= 57$

$$A = \frac{1}{2}(15)(19.6)$$

$$= 147$$

$P = 57 \text{ mm}$

$A = 147 \text{ mm}^2$

7.  $P = 21 + 20 + 29$ 

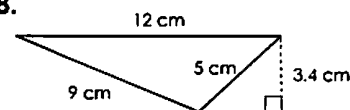
$= 70$

$$A = \frac{1}{2}(20)(21)$$

$$= 210$$

$P = 70 \text{ mi}$

$A = 210 \text{ mi}^2$

8.  $P = 12 + 5 + 9$ 

$= 26$

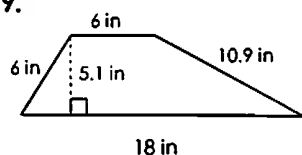
$$A = \frac{1}{2}(12)(5)$$

$$= 30$$

$P = 26 \text{ cm}$

$A = 30 \text{ cm}^2$

9.



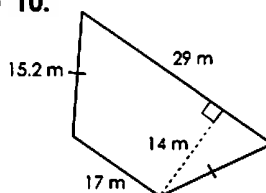
$$P = 6 + 6 + 10.9 + 18 = 40.9$$

$$A = \frac{1}{2}(5.1)(6 + 18) = 61.2$$

$$P = 40.9 \text{ in}$$

$$A = 61.2 \text{ in}^2$$

10.



$$P = 2(15.2) + 17 + 29 = 76.4$$

$$A = \frac{1}{2}(14)(17 + 29) = 322$$

$$P = 76.4 \text{ m}$$

$$A = 322 \text{ m}^2$$

11. If the area of a triangle with a base measuring 22 feet is 93.5 square feet, find its height.

$$A = \frac{1}{2}bh$$

$$93.5 = \frac{1}{2}(22) \cdot h$$

$$93.5 = 11h$$

$$h = 8.5 \text{ ft}$$

12. A trapezoid has a height of 6 inches, an area of 120 square inches, and one base measuring 13 inches. Find the length of the other base.

$$A = \frac{1}{2}h(b_1 + b_2)$$

$$120 = \frac{1}{2}(6)(b + 13)$$

$$120 = 3(b + 13)$$

$$40 = b + 13$$

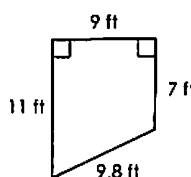
$$27 \text{ in} = b$$

13. Mark is hosting a "Who Dunit?" party at his house. He plans on taping off a triangular section of his backyard to represent the crime scene. If the sides measure 23 feet, 15 feet, and 32 feet, how much tape will he need?

$$P = 23 + 15 + 32$$

$$P = 70 \text{ ft}$$

14. A sandbox in the shape of a trapezoid is shown below. If a cover is to be made for the sandbox, what is the minimum amount of fabric needed?



$$A = \frac{1}{2}(9)(11 + 7)$$

$$= 81 \text{ ft}^2$$

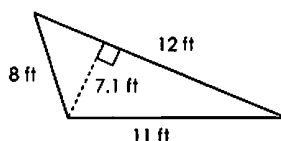
15. Adalyn's mom is painting a wall in her bedroom with chalkboard paint. If the dimensions of the wall are 12 feet by 9 feet and one can of paint covers up to 110 square feet, will one can be enough to cover the wall? Explain.

$$A = 12(9)$$

$$= 108 \text{ ft}^2$$

1 can

16. Mr. Holmes is buying mulch for his triangular-shaped garden shown below. The mulch he is purchasing costs \$3.75 per bag. If each bag covers 18 square feet, how much will it cost him?

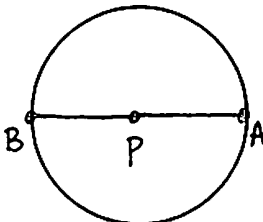
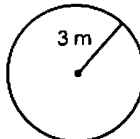
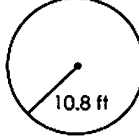
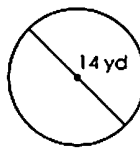
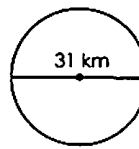
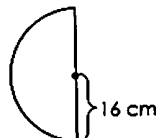
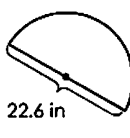


$$A = \frac{1}{2}(7.1)(12)$$


$$= 42.6 \text{ ft}^2$$

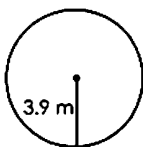
$$3 \text{ bags} = \$11.25$$

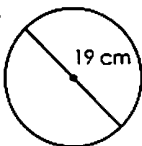
Name:	Date:
Topic:	Class:

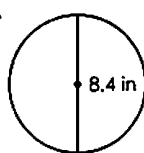
Main Ideas/Questions	Notes/Examples	
<b>CIRCLE</b>	A set of points equidistant from a given point called the center.	
<b>PARTS OF A CIRCLE</b> 	<b>Center:</b> The given point in which all points are equidistant from. Example- circle P	
	<b>Radius:</b> The distance from the center to any point on the circle. Example- $\overline{AP}$	
	<b>Diameter:</b> The distance across the circle through the center. The diameter is twice the radius. Ex- $\overline{AB}$	
	<b>Circumference:</b> The distance around the circle.	
	<b>FORMULAS</b>	
<b>AREA &amp; Circumference</b>	<b>AREA OF A CIRCLE:</b> $A = \pi \cdot r^2$	<b>CIRCUMFERENCE OF A CIRCLE:</b> $C = 2\pi r$ or $C = \pi \cdot d$
	Find the area of each circle. Round to the nearest tenth.	
	1.  $A = \pi \cdot 3^2$ $= 28.3 \text{ m}^2$	2.  $A = \pi \cdot 10.8^2$ $= 366.4 \text{ ft}^2$
	3.  $A = \pi \cdot 7^2$ $= 153.9 \text{ yd}^2$	4.  $A = \pi \cdot 15.5^2$ $= 754.8 \text{ km}^2$
	5.  $A = \frac{\pi \cdot 16^2}{2}$ $= 402.1 \text{ cm}^2$	6.  $A = \frac{\pi \cdot 11.3^2}{2}$ $= 200.6 \text{ in}^2$
	<div style="border: 1px solid black; padding: 5px; display: inline-block;">             Half of a circle is called a <b>semicircle</b> </div>	

Find the circumference of each circle. Round to the nearest tenth.

7.   $C = 2\pi \cdot 17$   
 $= 106.8 \text{ mm}$

8.   $C = 2\pi \cdot 3.9$   
 $= 24.5 \text{ m}$

9.   $C = 19 \cdot \pi$   
 $= 59.7 \text{ cm}$

10.   $C = 8.4 \cdot \pi$   
 $= 26.4 \text{ in}$

## Applications

11. Find the radius of a circle if its area is 706.9 square millimeters.

$$A = \pi r^2$$

$$706.9 = \pi r^2$$

$$225 = r^2$$

$$15 \text{ mm} = r$$

12. If the area of a circle is 28.27 square inches, find the length of its diameter.

$$A = \pi r^2$$

$$28.27 = \pi r^2$$

$$9 = r^2$$

$$3 = r$$

$$d = 6 \text{ in}$$

13. If the circumference of a circle is 41.8 feet, find the diameter of the circle.

$$C = \pi d$$

$$41.8 = \pi d$$

$$d = 13.3 \text{ ft}$$

14. The circumference of a circle is 50.24 centimeters. Find its radius.

$$C = 2\pi \cdot r$$

$$50.24 = 2\pi \cdot r$$

$$8 \text{ cm} = r$$

15. If the tire on a bike has a radius of 12 inches, how far will the bike travel in 100 rotations?

$$C = 2\pi \cdot 12$$

$$= 75.4 \text{ in}$$

$$7540 \text{ in}$$

16. Lisa has a circular garden with a diameter of 17.5 feet. If she uses 3 teaspoons of fertilizer for every 30 square feet of garden, how much fertilizer will she need to cover the garden?

$$A = \pi (8.75)^2$$

$$= 240.5 \text{ ft}^2$$

$$\frac{3}{30} = \frac{x}{240.5}$$

$$x = 24.05$$

$$25 \text{ tsp}$$

Name: \_\_\_\_\_

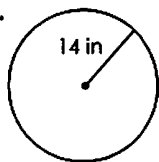
Unit 8: Measurement (Area and Volume)

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 2: Area &amp; Circumference of Circles

**\*\* This is a 2-page document! \*\*****Directions:** Find the area and circumference of each circle. Round to the nearest tenth.

1.



$$A = \pi \cdot 14^2$$

$$= 615.8$$

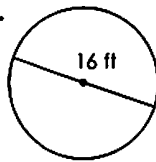
$$C = 2\pi \cdot 14$$

$$= 88$$

$$A = 615.8 \text{ in}^2$$

$$C = 88 \text{ in}$$

2.



$$A = \pi \cdot 16^2$$

$$= 201.1$$

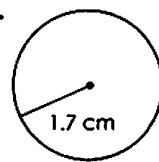
$$C = 2\pi \cdot 16$$

$$= 50.3$$

$$A = 201.1 \text{ ft}^2$$

$$C = 50.3 \text{ ft}$$

3.



$$A = \pi \cdot 1.7^2$$

$$= 9.1$$

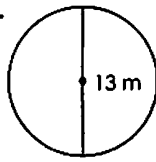
$$C = 2\pi \cdot 1.7$$

$$= 10.7$$

$$A = 9.1 \text{ cm}^2$$

$$C = 10.7 \text{ cm}$$

4.



$$A = \pi \cdot 13^2$$

$$= 132.7$$

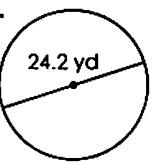
$$C = 2\pi \cdot 13$$

$$= 40.8$$

$$A = 132.7 \text{ m}^2$$

$$C = 40.8 \text{ m}$$

5.



$$A = \pi \cdot 24.2^2$$

$$= 460$$

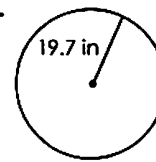
$$C = 2\pi \cdot 24.2$$

$$= 76$$

$$A = 460 \text{ yd}^2$$

$$C = 76 \text{ yd}$$

6.



$$A = \pi \cdot 19.7^2$$

$$= 1219.2$$

$$C = 2\pi \cdot 19.7$$

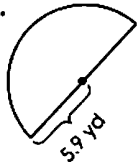
$$= 123.8$$

$$A = 1219.2 \text{ in}^2$$

$$C = 123.8 \text{ in}$$

**Directions:** Find the area each semicircle. Round to the nearest tenth.

7.

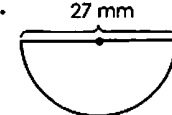


$$A = \frac{\pi \cdot 5.9^2}{2}$$

$$= 54.7$$

$$A = 54.7 \text{ yd}^2$$

8.



$$A = \frac{\pi \cdot 27^2}{2}$$

$$= 265.5$$

$$A = 265.5 \text{ mm}^2$$

9. If a penny has a circumference of 59.69 millimeters, what is the radius of a penny?

$$59.69 = 2\pi r$$

$$9.5 = r$$

$$\boxed{9.5 \text{ mm}}$$

10. A drink coaster in the shape of a circle has an area of 19.63 square inches. Find the diameter of the coaster.

$$19.63 = \pi r^2$$

$$6.25 = r^2$$

$$2.5 = r$$

$$\boxed{d = 5 \text{ in}}$$

11. A dog is leashed to a point in the center of a large yard. If the leash is 18.8 feet long, what is the total area of the region the dog is able to explore?

$$A = \pi \cdot 18.8^2$$

$$= \boxed{1110.4 \text{ ft}^2}$$

12. A Ferris wheel has a diameter of 95 feet. How far will someone travel if they ride two full rotations on the wheel?

$$C = \pi \cdot 95$$

$$= 298.5$$

$$\boxed{597 \text{ ft}}$$

13. A bowling ball has a diameter of 8.5 inches. If it is rolled down a 60-foot bowling lane, how many complete revolutions will it make?

$$C = \pi \cdot 8.5$$

$$= 26.7 \text{ in}$$

$$\frac{(6 \text{ ft} \rightarrow) 720 \text{ in}}{26.7} = \boxed{27 \text{ revolutions}}$$

14. It costs a pool cover manufacturer \$0.15 per square foot for the material they use to make pool covers. If a certain circular pool requires a cover with a 24-foot diameter, find the cost for the material.

$$A = \pi \cdot 12^2$$

$$= 452.4$$

$$\boxed{\$ 67.86}$$

15. Maggie has a circular table cloth with a 72-inch diameter that she plans to sew lace around. If the lace comes in 3-foot rolls, how many rolls will she need?

$$C = \pi \cdot 72$$

$$= 226.2 \text{ in } (\rightarrow 18.85 \text{ ft})$$

$$\frac{18.85}{3} = 6.3$$

$$\boxed{7 \text{ rolls}}$$

16. Find the area of a circle with a circumference of 31.42 centimeters.

$$31.42 = 2\pi r$$

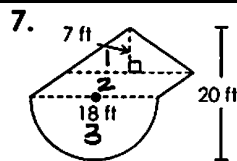
$$5 = r$$

$$A = \pi \cdot 5^2$$

$$= \boxed{78.5 \text{ cm}^2}$$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
Composite Figure	A figure that can be separated into regions that are basic plane figures.
Area of a Composite Figure	<p>To find the area of a composite figure:</p> <ol style="list-style-type: none"> <li>1 Break the figure apart into shapes with areas you can find. (Squares, rectangles, parallelograms, triangles, trapezoids, and circles)</li> <li>2 Find the area of each of these shapes.</li> <li>3 Find the sum of these areas.</li> </ol>
Examples	<p>Find the area of each figure. Assume all lines that appear to be parallel are parallel. Round to the nearest tenth if necessary.</p> <div> <p>1.</p> <math display="block">A_1 = 8(13) = 104</math> <math display="block">A_2 = \frac{1}{2}(14)(4) = 28</math> <math display="block">A = 104 + 28 = \boxed{132 \text{ in}^2}</math> </div> <div> <p>2.</p> <math display="block">A_1 = 10(23) = 230</math> <math display="block">A_2 = \frac{1}{2}(24)(7) = 84</math> <math display="block">A = 230 + 84 = \boxed{314 \text{ m}^2}</math> </div> <div> <p>3.</p> <math display="block">A_1 = \frac{1}{2}\pi(4.5)^2 = 31.8</math> <math display="block">A_2 = 9^2 = 81</math> <math display="block">A = 31.8 + 81 = \boxed{112.8 \text{ cm}^2}</math> </div> <div> <p>4.</p> <math display="block">A_1 = \frac{1}{2}(28)(11) = 154</math> <math display="block">A_2 = \frac{1}{2}(23)(15+28) = 494.5</math> <math display="block">A = 154 + 494.5 = \boxed{648.5 \text{ ft}^2}</math> </div> <div> <p>5.</p> <math display="block">A_1 = \frac{1}{2}\pi(7.5)^2 = 88.4</math> <math display="block">A_2 = \frac{1}{2}\pi(11)^2 = 190.1</math> <math display="block">A = 88.4 + 190.1 = \boxed{278.5 \text{ mm}^2}</math> </div> <div> <p>6.</p> <math display="block">A_1 = \frac{1}{2}(12)(5+17) = 132</math> <math display="block">A_2 = 9(17) = 153</math> <math display="block">A = 132 + 153 = \boxed{285 \text{ m}^2}</math> </div>

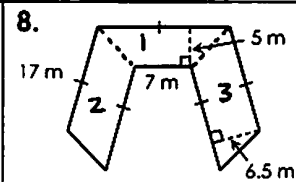


$$A_1 = \frac{1}{2}(18)(7) = 63$$

$$A_2 = 18(4) = 72$$

$$A_3 = \frac{1}{2}\pi(9)^2 = 127.2$$

$$A = 63 + 72 + 127.2 = 262.2 \text{ ft}^2$$

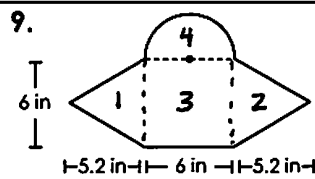


$$A_1 = \frac{1}{2}(5)(7+17) = 60$$

$$A_2 = 17(6.5) = 110.5$$

$$A_3 = 17(6.5) = 110.5$$

$$A = 2(110.5) + 60 = 281 \text{ m}^2$$



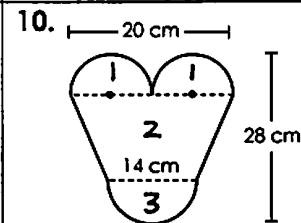
$$A_1 = \frac{1}{2}(6)(5.2) = 15.6$$

$$A_2 = \frac{1}{2}(6)(5.2) = 15.6$$

$$A_3 = 6(6) = 36$$

$$A_4 = \frac{1}{2}\pi(3)^2 = 14.1$$

$$A = 2(15.6) + 36 + 14.1 = 81.3 \text{ in}^2$$



$$A_1 = \pi(5)^2 = 78.5$$

$$A_2 = \frac{1}{2}(16)(14+20) = 136$$

$$A_3 = \frac{1}{2}\pi(7)^2 = 77$$

$$A = 78.5 + 272 + 77 = 427.5 \text{ cm}^2$$

## Area & Perimeter

Figure	Area	Perimeter
<p>11.</p>	$A_1 = \frac{1}{2}(12.5)(7+23) = 187.5$ $A_2 = 4(23) = 92$ $A = 279.5 \text{ ft}^2$	$7 + 2(15) + 2(9) + 23$ $= 78 \text{ ft}$
<p>12.</p>	$A_1 = \frac{1}{2}(9)(12) = 54$ $A_2 = \frac{1}{2}\pi(7.5)^2 = 88.4$ $A = 142.4 \text{ mm}^2$	$\text{Semi: } (\frac{1}{2}\pi d) = 23.6$ $23.6 + 9 + 12 = 44.6 \text{ mm}$
<p>13.</p>	$A_1 = \pi(6)^2 = 113.1$ $A_2 = \frac{1}{2}(16)(8.9) = 71.2$ $A_3 = 7.1(16) = 113.6$ $A = 297.9 \text{ in}^2$	$\text{circle: } (\pi d) = 37.7$ $2(7.1) + 16 + 37.7$ $= 67.9 \text{ in}$

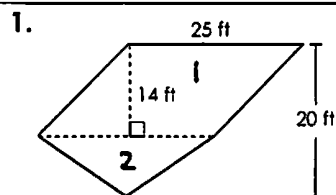


Name: \_\_\_\_\_

Unit 8: Measurement (Area and Volume)

Date: \_\_\_\_\_ Per: \_\_\_\_\_

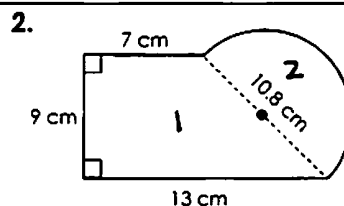
Homework 3: Area &amp; Perimeter of Composite Figures

**\*\* This is a 2-page document! \*\*****Directions:** Find the area of each figure. Assume all lines that appear to be parallel are parallel. Round to the nearest tenth if necessary.

$$A_1 = 14(25) = 350$$

$$A_2 = \frac{1}{2}(25)(6) = 75$$

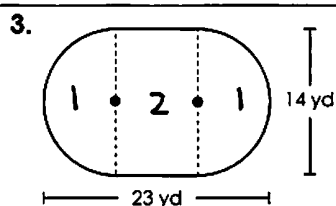
$$A = 350 + 75 = \boxed{425 \text{ ft}^2}$$



$$A_1 = \frac{1}{2}(9)(7+13) = 90$$

$$A_2 = \frac{1}{2}\pi(5.4)^2 = 45.8$$

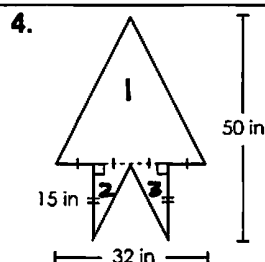
$$A = 90 + 45.8 = \boxed{135.8 \text{ cm}^2}$$



$$A_1 = \pi(7)^2 = 153.9$$

$$A_2 = 14(9) = 126$$

$$A = 153.9 + 126 = \boxed{279.9 \text{ yd}^2}$$

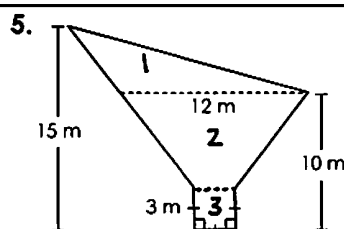


$$A_1 = \frac{1}{2}(32)(35) = 560$$

$$A_2 = \frac{1}{2}(8)(15) = 60$$

$$A_3 = \frac{1}{2}(8)(15) = 60$$

$$A = 2(60) + 560 = \boxed{680 \text{ in}^2}$$

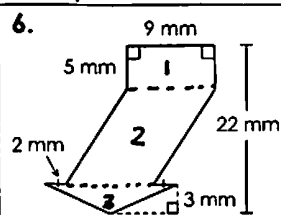


$$A_1 = \frac{1}{2}(5)(12) = 30$$

$$A_2 = \frac{1}{2}(7)(3+12) = 52.5$$

$$A_3 = 3(3) = 9$$

$$A = 30 + 52.5 + 9 = \boxed{91.5 \text{ m}^2}$$



$$A_1 = 9(5) = 45$$

$$A_2 = 14(9) = 126$$

$$A_3 = \frac{1}{2}(13)(3) = 19.5$$

$$A = 45 + 126 + 19.5 = \boxed{190.5 \text{ mm}^2}$$

**Directions:** Find the area and perimeter of each figure. Assume all lines that appear to be parallel are parallel. Round to the nearest tenth if necessary.

Figure	Area	Perimeter
<p>7.</p>	$A_1 = \frac{1}{2} (4.6) (20) = 46$ $A_2 = 8 (25) = 200$ $A_3 = \frac{1}{2} (4.6) (20) = 46$ $A = 292 \text{ cm}^2$	$4(11) + 4(6) + 2(25)$ $= 118 \text{ cm}$
<p>8.</p>	$A_1 = \frac{1}{2} (10) (13 + 29) = 210$ $A_2 = \frac{1}{2} (16) (7 + 25) = 256$ $A = 466 \text{ in}^2$	$10 + 29 + 25 + 18.4 + 7 + 13$ $= 102.4 \text{ in}$
<p>9.</p>	$A_1 = \frac{1}{2} \pi (11.5)^2 = 207.7$ $A_2 = 13 (22) = 286$ $A_3 = \frac{1}{2} (10) (24) = 120$ $A = 613.7 \text{ ft}^2$	<p>(Semi: 36.1)</p> $36.1 + 2(13) + 24 + 10 + 3$ $= 99.1 \text{ ft}$
<p>10.</p>	$A_1 = \pi (4)^2 = 50.3$ $A_2 = \frac{1}{2} (16) (13.9) = 111.2$ $A = 161.5 \text{ m}^2$	<p>(Circle: 25.1)</p> $25.1 + 2(16)$ $= 57.1 \text{ m}$

Name:

Date:

Topic:

Class:

## Main Ideas/Questions

## Notes/Examples

# Area of SHADED REGIONS

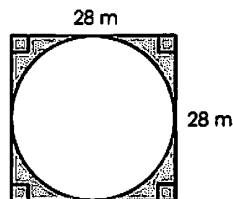
To find the area of a shaded region:

- 1 Find the area of the entire region.
- 2 Find the area of the unshaded region(s).
- 3 Subtract the area of the unshaded region from the area of the entire region.

## EXAMPLES

Find the area of the shaded region. Assume all lines that appear to be parallel are parallel. Round to the nearest tenth if necessary.

1.

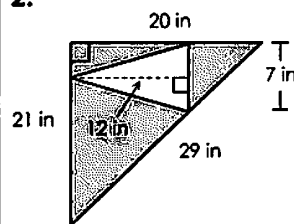


$$A_{\text{out}} = 28^2 = 784$$

$$A_{\text{in}} = \pi \cdot 14^2 = 615.8$$

$$784 - 615.8 = \boxed{168.2 \text{ m}^2}$$

2.

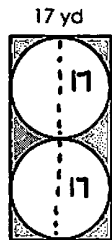


$$A_{\text{out}} = \frac{1}{2}(20)(21) = 210$$

$$A_{\text{in}} = \frac{1}{2}(7)(12) = 42$$

$$210 - 42 = \boxed{168 \text{ in}^2}$$

3.

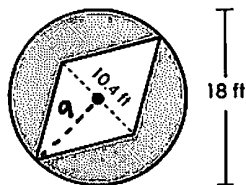


$$A_{\text{out}} = 17(34) = 578$$

$$A_{\text{in}} = 2 \cdot \pi \cdot 8.5^2 = 454$$

$$578 - 454 = \boxed{124 \text{ yd}^2}$$

4.

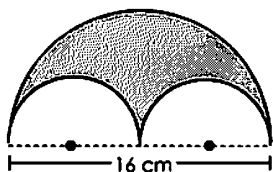


$$A_{\text{out}} = \pi \cdot 9^2 = 254.5$$

$$A_{\text{in}} = 2 \left[ \frac{1}{2}(10.4)(9) \right] = 93.6$$

$$254.5 - 93.6 = \boxed{160.9 \text{ ft}^2}$$

5.

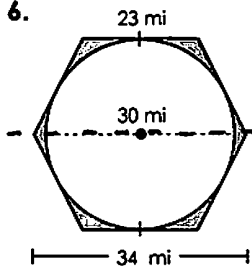


$$A_{out} = \frac{1}{2} \pi (8)^2 = 100.5$$

$$A_{in} = \pi \cdot 4^2 = 50.3$$

$$100.5 - 50.3 = \boxed{50.2 \text{ cm}^2}$$

6.

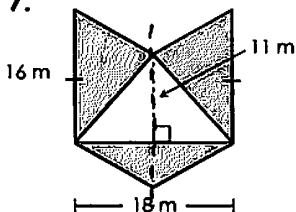


$$A_{out} = 2 \left[ \frac{1}{2} (15)(23+34) \right] = 855$$

$$A_{in} = \pi \cdot 15^2 = 706.9$$

$$855 - 706.9 = \boxed{148.1 \text{ mi}^2}$$

7.

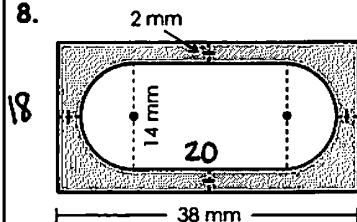


$$A_{out} = 2 [16(9)] = 288$$

$$A_{in} = \frac{1}{2} (18)(11) = 99$$

$$288 - 99 = \boxed{189 \text{ m}^2}$$

8.

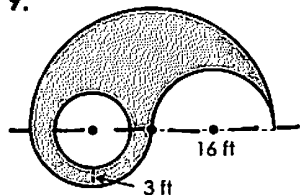


$$A_{out} = 18(38) = 684$$

$$A_{in} = \pi \cdot 7^2 + 14(20) = 433.9$$

$$684 - 433.9 = \boxed{250.1 \text{ mm}^2}$$

9.



$$A_{out} = \frac{1}{2} \pi 16^2 + \frac{1}{2} \pi \cdot 8^2$$

$$= 502.7$$

$$A_{in} = \frac{1}{2} \pi \cdot 8^2 + \pi \cdot 5^2$$

$$= 179.1$$

$$502.7 - 179.1 = \boxed{323.6 \text{ ft}^2}$$

Name: \_\_\_\_\_

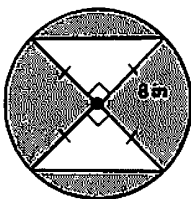
Unit 8: Measurement (Area and Volume)

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 4: Area of Shaded Regions

**\*\* This is a 2-page document! \*\*****Directions:** Find the area of the shaded region. Assume all lines that appear to be parallel are parallel. Round to the nearest tenth if necessary.

1.

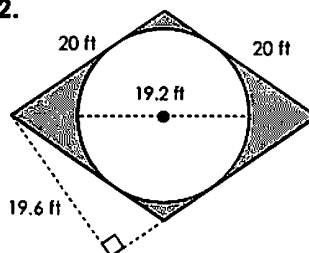


$$A_{\text{out}} = \pi \cdot 8^2 = 201.1$$

$$A_{\text{in}} = 2 \left[ \frac{1}{2} (8)(8) \right] = 64$$

$$201.1 - 64 = \boxed{137.1 \text{ in}^2}$$

2.

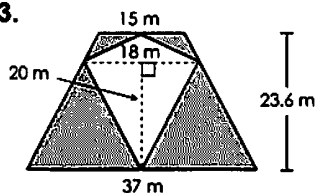


$$A_{\text{out}} = 20(19.6) = 392$$

$$A_{\text{in}} = \pi \cdot 9.6^2 = 289.5$$

$$392 - 289.5 = \boxed{102.5 \text{ ft}^2}$$

3.

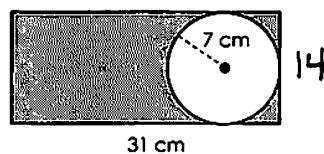


$$A_{\text{out}} = \frac{1}{2} (23.6) (15 + 37) = 613.6$$

$$A_{\text{in}} = \frac{1}{2} (18)(3.6) + \frac{1}{2} (18)(20) = 212.4$$

$$613.6 - 212.4 = \boxed{401.2 \text{ m}^2}$$

4.

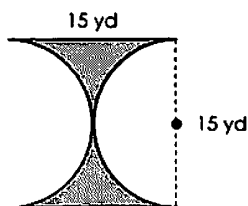


$$A_{\text{out}} = 31(14) = 434$$

$$A_{\text{in}} = \pi \cdot 7^2 = 153.9$$

$$434 - 153.9 = \boxed{280.1 \text{ cm}^2}$$

5.

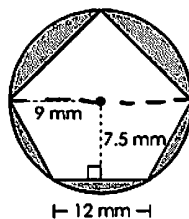


$$A_{\text{out}} = 15^2 = 225$$

$$A_{\text{in}} = \pi \cdot 7.5^2 = 176.7$$

$$225 - 176.7 = \boxed{48.3 \text{ yd}^2}$$

6.

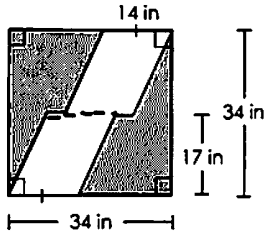


$$A_{\text{out}} = \pi \cdot 9^2 = 254.5$$

$$A_{\text{in}} = \frac{1}{2} (18)(9) + \frac{1}{2} (7.5)(12 + 18) = 193.5$$

$$254.5 - 193.5 = \boxed{61 \text{ mm}^2}$$

7.

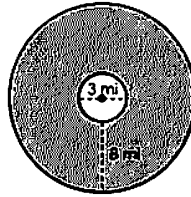


$$A_{\text{out}} = 34^2 = 1156$$

$$A_{\text{in}} = 2[14(17)] = 476$$

$$1156 - 476 = \boxed{680 \text{ in}^2}$$

8.

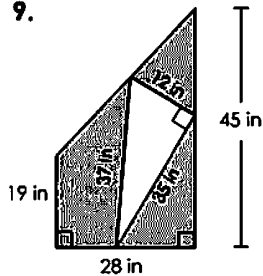


$$A_{\text{out}} = \pi \cdot 9.5^2 = 283.5$$

$$A_{\text{in}} = \pi \cdot 1.5^2 = 7.1$$

$$283.5 - 7.1 = \boxed{276.4 \text{ m}^2}$$

9.

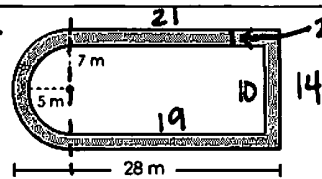


$$A_{\text{out}} = \frac{1}{2}(28)(45) = 896$$

$$A_{\text{in}} = \frac{1}{2}(12)(35) = 210$$

$$896 - 210 = \boxed{686 \text{ in}^2}$$

10.

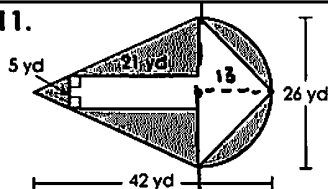


$$A_{\text{out}} = 21(14) + \frac{1}{2}\pi \cdot 7^2 = 371$$

$$A_{\text{in}} = 10(14) + \frac{1}{2}\pi \cdot 5^2 = 229.3$$

$$371 - 229.3 = \boxed{141.7 \text{ m}^2}$$

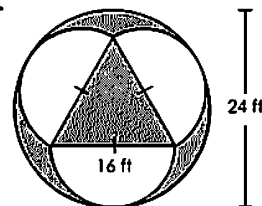
11.



$$A_{\text{out}} = \frac{1}{2}(26)(29) + \frac{1}{2}\pi \cdot 13^2 = 642.5$$

$$A_{\text{in}} = 21(5) + \frac{1}{2}(26)(13)$$

12.



$$A_{\text{out}} = \pi \cdot 12^2 = 452.4$$

$$A_{\text{in}} = 3\left[\frac{1}{2}\pi \cdot 8^2\right] = 301.6$$

$$452.4 - 301.6 = \boxed{150.8 \text{ ft}^2}$$

Name: \_\_\_\_\_

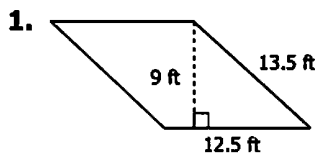
Pre-Algebra

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Unit 8: Measurement (Area & Volume)

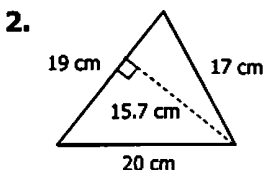
### Quiz 8-1: Perimeter & Area

Find the perimeter and area of each figure.



$$P = 2(13.5) + 2(12.5)$$

$$A = 9(12.5)$$



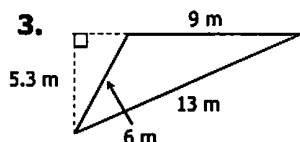
$$A = \frac{1}{2}(19)(15.7)$$

1.  $P = 52 \text{ ft}$

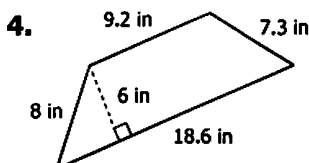
$A = 112.5 \text{ ft}^2$

2.  $P = 56 \text{ cm}$

$A = 149.15 \text{ cm}^2$



$$A = \frac{1}{2}(9)(5.3)$$



$$A = \frac{1}{2}(6)(9.2 + 18.6)$$

3.  $P = 28 \text{ m}$

$A = 23.85 \text{ m}^2$

4.  $P = 43.1 \text{ in}$

$A = 83.4 \text{ in}^2$

5. A triangle with a base measuring 12 meters has an area of 57 square meters. Find the height of the triangle.

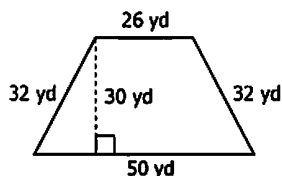
$$57 = \frac{1}{2}(12) \cdot h$$

$$57 = 6h$$

5.  $9.5 \text{ m}$

6.  $\$1,995$

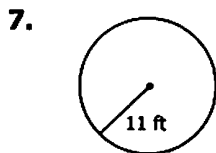
6. An asphalt parking lot is in the shape of a trapezoid. If it costs \$1.75 per square yard to seal an asphalt surface, find the cost to seal the parking lot.



$$A = \frac{1}{2}(30)(26 + 50)$$

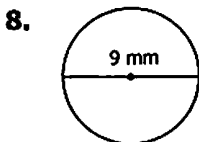
$$A = 1140$$

Find the circumference and area of each circle. Round to the nearest tenth.



$$C = 2\pi \cdot 11$$

$$A = \pi \cdot 11^2$$



$$C = \pi \cdot 9$$

$$A = \pi \cdot 4.5^2$$

7.  $C = 69.1 \text{ ft}$

$A = 380.1 \text{ ft}^2$

8.  $C = 28.3 \text{ mm}$

$A = 63.6 \text{ mm}^2$

9. If the area of a pizza is 153.94 square inches, find the length of its diameter.

$$153.94 = \pi r^2$$

$$49 = r^2$$

$$7 = r$$

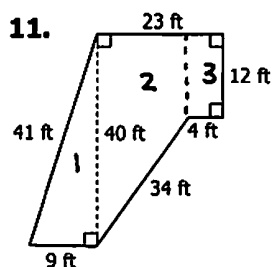
9. 14 in

10. 100.5 in

10. The minute hand on a large clock has a radius of 16 inches. Find the distance the minute hand will travel in one hour.

$$C = 2\pi \cdot 16$$

Find the perimeter and area of each figure. Round to the nearest tenth if necessary.



$$A_1 = \frac{1}{2} (9)(40) = 180$$

$$A_2 = \frac{1}{2} (19)(12+40) = 494$$

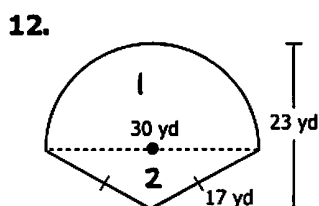
$$A_3 = 12(4) = 48$$

11.  $P =$  123 ft

$A =$  722 ft<sup>2</sup>

12.  $P =$  81.1 yd

$A =$  473.4 yd<sup>2</sup>

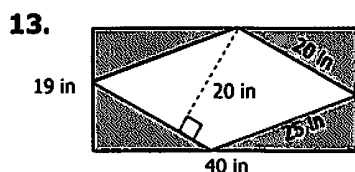


$$A_1 = \frac{1}{2} \pi \cdot 15^2 = 353.4$$

$$A_2 = \frac{1}{2} (8)(30) = 120$$

$$C(\text{semi}) = \frac{1}{2} \pi (30) = 47.1$$

Find the area of the shaded region. Round to the nearest tenth if necessary.



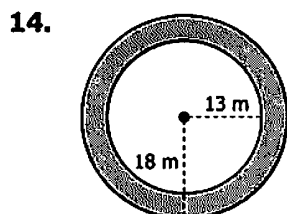
$$A_{\text{out}} = 19(40) = 760$$

$$A_{\text{in}} = 20(20) = 400$$

$$760 - 400 = 360$$

13.  $A =$  360 in<sup>2</sup>

14.  $A =$  487 m<sup>2</sup>



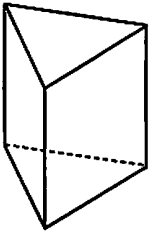
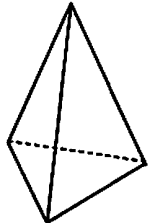
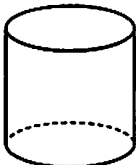
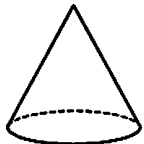
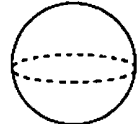
$$A_{\text{out}} = \pi \cdot 18^2 = 1017.9$$

$$A_{\text{in}} = \pi \cdot 13^2 = 530.9$$

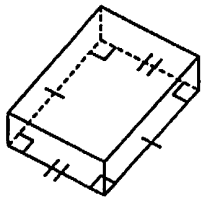
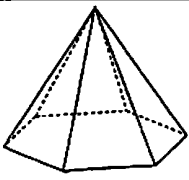
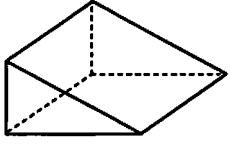
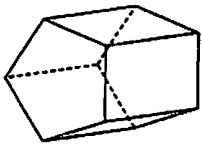
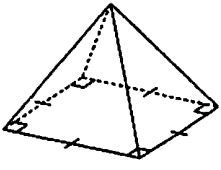
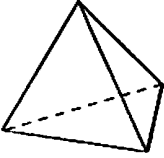
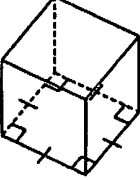
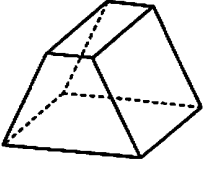
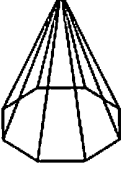
$$1017.9 - 530.9$$

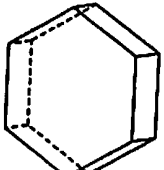
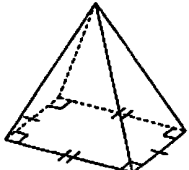
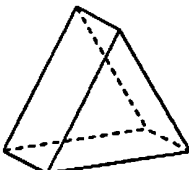


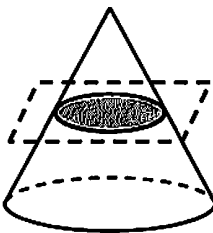
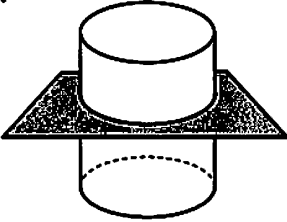

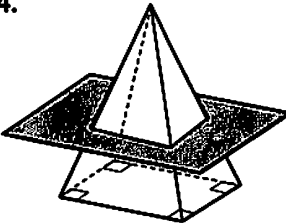
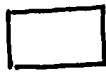
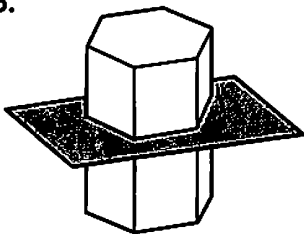

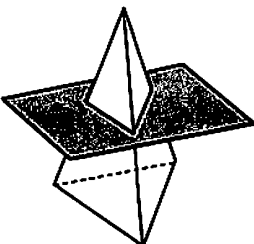

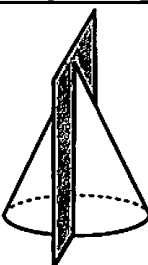

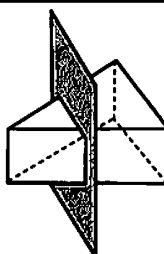

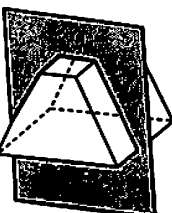

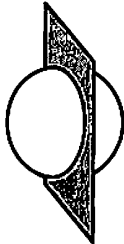

# CLASSIFYING 3D FIGURES

<h2>PRISM</h2> <p>A solid with <b>two bases</b> that are congruent and parallel.</p> <p>This figure is a <b>triangular prism</b> because the bases are triangles.</p> 	<h2>PYRAMID</h2> <p>A solid with <b>one base</b> and sides that meet at a point.</p> <p>This figure is a <b>triangular pyramid</b> because the base is a triangle.</p> 	
<h2>CYLINDER</h2> <p>A prism with circular bases.</p> 	<h2>CONE</h2> <p>A pyramid with a circular base.</p> 	<h2>SPHERE</h2> <p>A solid in which each point is equidistant from a center point.</p> 

## NAMING PRISMS & PYRAMIDS

Directions: Classify each solid. Then determine how many faces, edges, and vertices it has.								
1. 	2. 	3. 						
Rectangular Prism	Hexagonal Pyramid	Triangular Prism						
Faces: 6	Faces: 7	Faces: 5	Edges: 12	Edges: 12	Edges: 9	Vertices: 8	Vertices: 7	Vertices: 6
4. 	5. 	6. 						
Pentagonal Prism	Square pyramid	Triangular Pyramid						
Faces: 7	Faces: 5	Faces: 4	Edges: 15	Edges: 8	Edges: 6	Vertices: 10	Vertices: 5	Vertices: 4
7. 	8. 	9. 						
Square prism	Trapezoidal Prism	Octagonal Pyramid						
Faces: 6	Faces: 6	Faces: 9	Edges: 12	Edges: 12	Edges: 16	Vertices: 8	Vertices: 8	Vertices: 9

10.		11.		12.				
Hexagonal Prism		Rectangular Pyramid		Triangular Prism				
Faces:	Edges:	Vertices:	Faces:	Edges:	Vertices:	Faces:	Edges:	Vertices:
8	18	12	5	8	5	5	9	6

SLICING 3D FIGURES						
When you slice a 3D figure, the cross section will be a two-dimensional plane figure. For example, when a cone is sliced parallel to its base as shown to the right, the cross-section that results is a <u>Circle</u> .						
Given each figure and a cut line, draw a diagram of the cross-section from a top-side view, then name the figure.						
13.		Cross-Section:		14.		Cross-Section:
			Circle			
						Rectangle
15.		Cross-Section:		16.		Cross-Section:
			Hexagon			
						Triangle
17.		Cross-Section:		18.		Cross-Section:
			Triangle			
						Rectangle
19.		Cross-Section:		20.		Cross-Section:
			Trapezoid			
						Circle

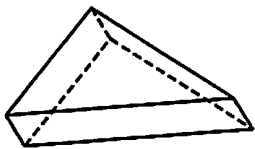
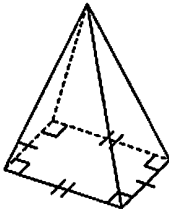
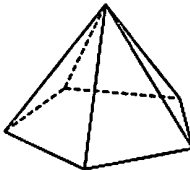
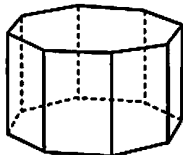
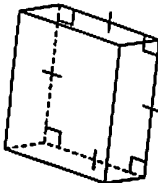
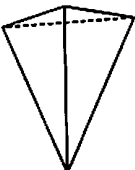
Name: \_\_\_\_\_

Unit 8: Measurement (Area and Volume)

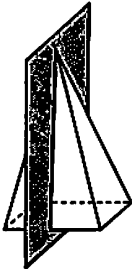

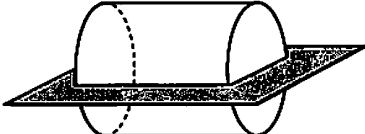

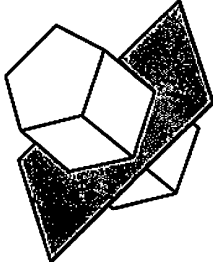
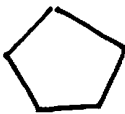
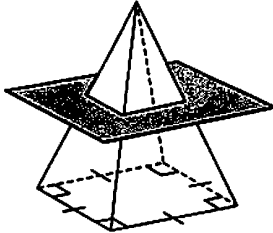

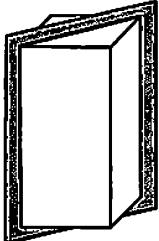

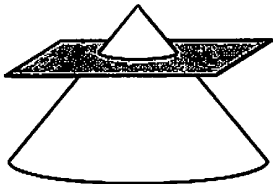

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 5: Classifying &amp; Slicing 3D Figures

**Directions:** Classify the solid, then give the number of faces, edges and vertices it has.

1.  Triangular Prism Faces: 5   Edges: 9   Vertices: 6	2.  Rectangular Pyramid Faces: 5   Edges: 8   Vertices: 5	3.  Pentagonal Pyramid Faces: 6   Edges: 10   Vertices: 6
4.  Octagonal Prism Faces: 10   Edges: 24   Vertices: 16	5.  Square Prism Faces: 6   Edges: 12   Vertices: 8	6.  Triangular Pyramid Faces: 4   Edges: 6   Vertices: 4

**Directions:** Draw and describe the shape that results from each cross section.

7.  Cross Section:  Triangle	8.  Cross Section:  Rectangle
9.  Cross Section:  Pentagon	10.  Cross Section:  Square
11.  Cross Section:  Rectangle	12.  Cross Section:  Circle

Name:

Date:

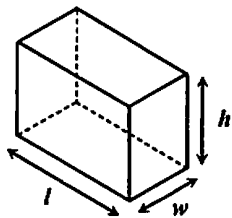
Topic:

Class:

## Main Ideas/Questions

## Notes/Examples

## Rectangular Prisms (or Cubes)

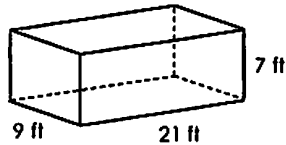


$$V = lwh$$

$l$  = length  
 $w$  = width  
 $h$  = height

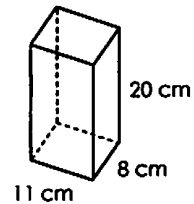
Find the volume of each rectangular prism.

1.



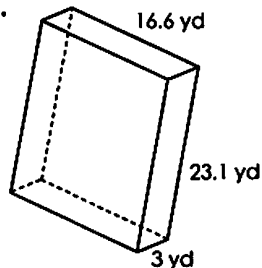
$$V = 9(21)(7) = 1323 \text{ ft}^3$$

2.



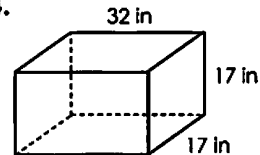
$$V = 11(8)(20) = 1760 \text{ cm}^3$$

3.



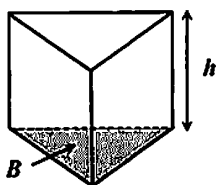
$$V = 16.6(3)(23.1) = 1150.38 \text{ yd}^3$$

4.



$$V = 32(17)(17) = 9248 \text{ in}^3$$

## All Other Prisms

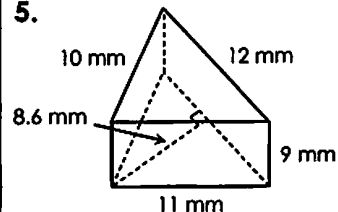


$$V = Bh$$

$B$  = area of the base  
 $h$  = height between bases

Find the volume of each prism.

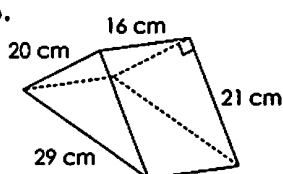
5.



$$B = \frac{1}{2}(12)(8.6) = 51.6$$

$$V = 51.6(9) = 464.4 \text{ mm}^3$$

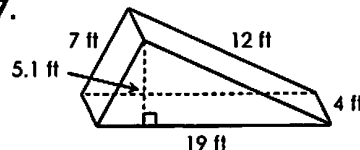
6.



$$B = \frac{1}{2}(20)(21) = 210$$

$$V = 210(16) = 3360 \text{ cm}^3$$

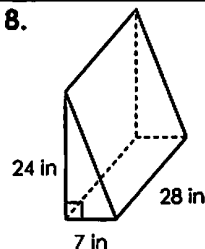
7.



$$B = \frac{1}{2}(19)(5.1) = 48.45$$

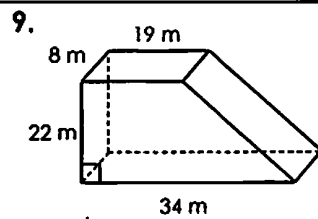
$$V = 48.45(4) = 193.8 \text{ ft}^3$$

8.



$$B = \frac{1}{2}(7)(24) = 84$$

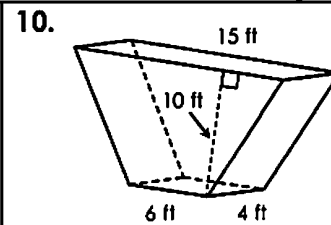
$$V = 84(28) = 2352 \text{ in}^3$$



$$B = \frac{1}{2}(22)(19 + 34)$$

$$= 583$$

$$V = 583(8) = \boxed{4664 \text{ m}^3}$$

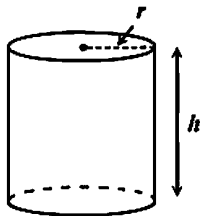


$$B = \frac{1}{2}(10)(15 + 6)$$

$$= 105$$

$$V = 105(4) = \boxed{420 \text{ ft}^3}$$

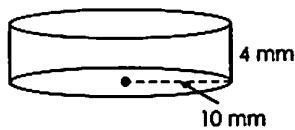
## Cylinders



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

$r$  = radius  
 $h$  = height

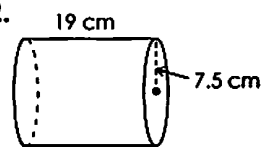
11.



$$V = \pi \cdot 10^2 \cdot 4$$

$$= \boxed{1256.6 \text{ mm}^3}$$

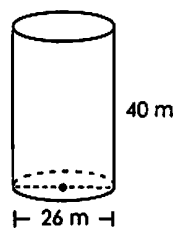
12.



$$V = \pi \cdot 7.5^2 \cdot 19$$

$$= \boxed{3357.6 \text{ cm}^3}$$

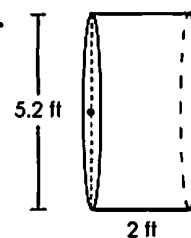
13.



$$V = \pi \cdot 13^2 \cdot 40$$

$$= \boxed{21237.2 \text{ m}^3}$$

14.



$$V = \pi \cdot 2.6^2 \cdot 5.2$$

$$= \boxed{42.5 \text{ ft}^3}$$

## Applications

15. Find the height of a cylinder with a radius of 4 inches and a volume of 301.6 cubic inches.

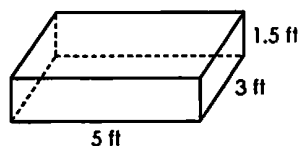
$$301.6 = \pi \cdot 4^2 \cdot h$$

$$301.6 = 16\pi \cdot h$$

$$6 = h$$

$\boxed{6 \text{ in}}$

16. Mr. Adams wants to fill his sandbox with sand. If one bag of sand fills five cubic feet, how many bags will he need to buy?



$$V = 5(3)(1.5)$$

$$= 22.5 \text{ ft}^3$$

$\boxed{5 \text{ bags}}$

Name: \_\_\_\_\_

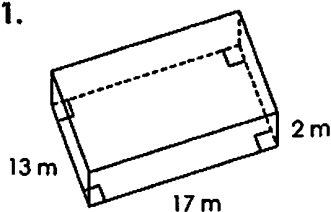
Unit 8: Measurement (Area and Volume)

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 6: Volume of Prisms &amp; Cylinders

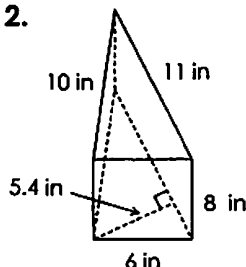
**\*\* This is a 2-page document! \*\*****Directions:** Find the volume of each figure. Round to the nearest tenth if necessary.

1.



$$V = 13(17)(2) = 442 \text{ m}^3$$

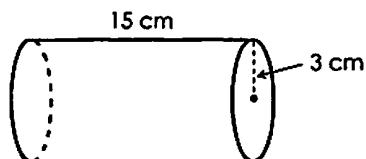
2.



$$B = \frac{1}{2}(5.4)(11) = 29.7$$

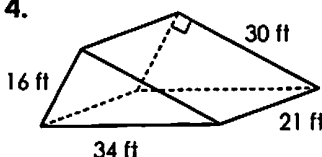
$$V = 29.7(8) = 237.6 \text{ in}^3$$

3.



$$V = \pi \cdot 3^2 \cdot 15 = 424.1 \text{ cm}^3$$

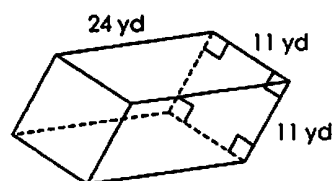
4.



$$B = \frac{1}{2}(16)(30) = 240$$

$$V = 240(21) = 5040 \text{ ft}^3$$

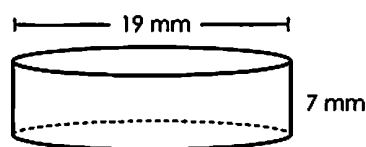
5.



$$B = 11^2 = 121$$

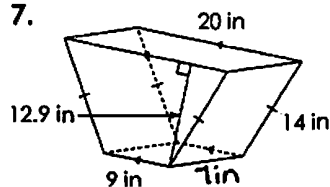
$$V = 121(24) = 2904 \text{ yd}^3$$

6.



$$V = \pi \cdot 9.5^2 \cdot 7 = 1984.7 \text{ mm}^3$$

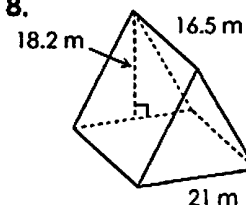
7.



$$B = \frac{1}{2}(12.9)(9+20) = 187.05$$

$$V = 187.05(7) = 1309.35 \text{ in}^3$$

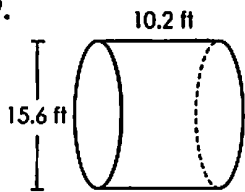
8.



$$B = \frac{1}{2}(21)(18.2) = 191.1$$

$$V = 191.1(16.5) = 3153.15 \text{ m}^3$$

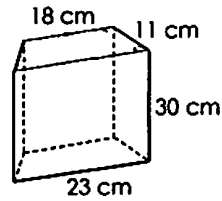
9.



$$V = \pi \cdot 7.8^2 \cdot 10.2$$

$$= \boxed{1949.6 \text{ ft}^3}$$

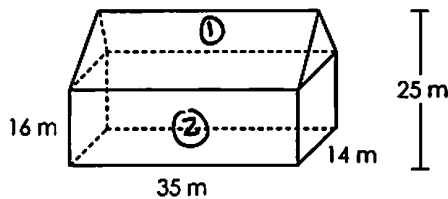
10.



$$B = \frac{1}{2}(11)(18 + 23) = 225.5$$

$$V = 225.5(30) = \boxed{6765 \text{ cm}^3}$$

11. Find the volume of the figure below.



$$B_1 = \frac{1}{2}(9)(14) = 63$$

$$V_1 = 63(35) = 2205$$

$$V_2 = 14(35)(16) = 7840$$

$$V = 2205 + 7840 = \boxed{10,045 \text{ m}^3}$$

12. The base of a rectangular prism has dimensions measuring 8 feet by 17 feet. If the volume of the prism is 1,632 cubic feet, find the height of the prism.

$$1632 = 8(17)h$$

$$1632 = 136h$$

$$12 = h$$

$$\boxed{12 \text{ ft}}$$

13. A cylinder with height of 4 meters has a volume of 2827.43 cubic meters. Find the length of the diameter.

$$2827.43 = \pi r^2 \cdot 4$$

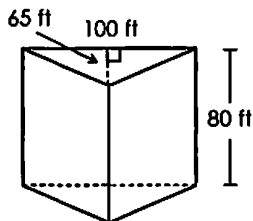
$$2827.43 = 4\pi r^2$$

$$225 = r^2$$

$$15 = r$$

$$\boxed{30 \text{ m}}$$

14. The aquarium has a fish tank in the shape of a prism. If the tank is  $\frac{3}{4}$  full of water, how much water is in the tank?



$$B = \frac{1}{2}(100)(65)$$

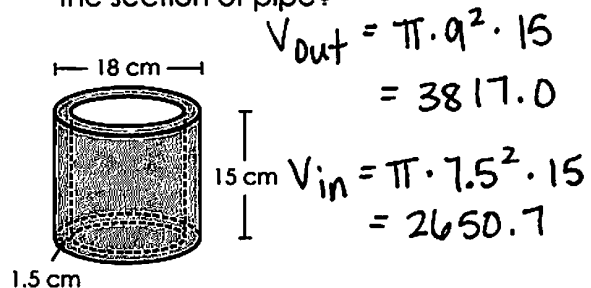
$$= 3250$$

$$V = 3250(80)$$

$$= 260,000$$

$$260,000 (.75) = \boxed{195,000 \text{ ft}^3}$$

15. The figure below shows a section of a metal pipe. How much metal was used to create the section of pipe?



$$V_{\text{out}} = \pi \cdot 9^2 \cdot 15$$

$$= 3817.0$$

$$V_{\text{in}} = \pi \cdot 7.5^2 \cdot 15$$

$$= 2650.7$$

$$3817 - 2650.7 = \boxed{1166.3 \text{ cm}^3}$$

Name:

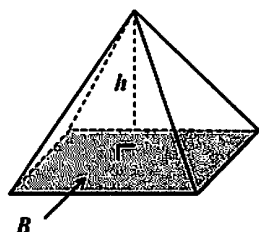
Date:

Topic:

Class:

## Main Ideas/Questions

## Pyramids



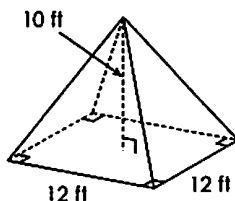
$$V = \frac{1}{3}Bh$$

$B$  = area of the base  
 $h$  = height

## Notes/Examples

Find the volume of each pyramid.

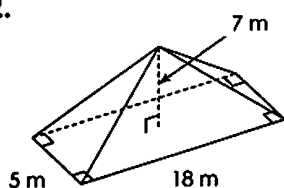
1.



$$B = 12^2 = 144$$

$$V = \frac{1}{3}(144)(10) = 480 \text{ ft}^3$$

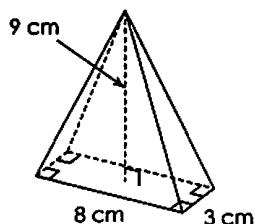
2.



$$B = 5(18) = 90$$

$$V = \frac{1}{3}(90)(7) = 210 \text{ m}^3$$

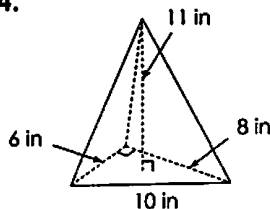
3.



$$B = 8(3) = 24$$

$$V = \frac{1}{3}(24)(9) = 72 \text{ cm}^3$$

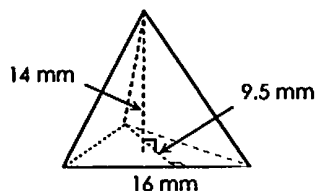
4.



$$B = \frac{1}{2}(6)(8) = 24$$

$$V = \frac{1}{3}(24)(11) = 88 \text{ in}^3$$

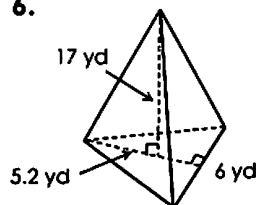
5.



$$B = \frac{1}{2}(16)(9.5) = 76$$

$$V = \frac{1}{3}(76)(14) = 354.7 \text{ mm}^3$$

6.

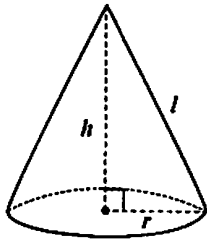


$$B = \frac{1}{2}(6)(5.2) = 15.6$$

$$V = \frac{1}{3}(15.6)(17) = 88.4 \text{ yd}^3$$



## Cones

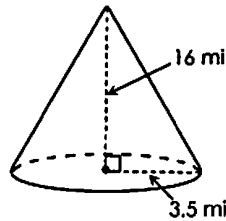


$$V = \frac{1}{3} \pi r^2 h$$

$r$  = radius  
 $h$  = height

Find the volume of each cone below. Round to the nearest tenth.

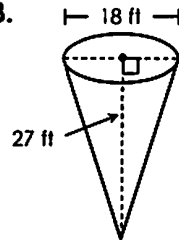
7.



$$V = \frac{1}{3} \cdot \pi \cdot 3.5^2 \cdot 16$$

$$= \boxed{205.3 \text{ mi}^3}$$

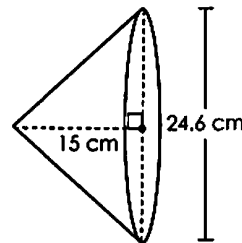
8.



$$V = \frac{1}{3} \cdot \pi \cdot 9^2 \cdot 27$$

$$= \boxed{2290.2 \text{ ft}^3}$$

9.



$$V = \frac{1}{3} \cdot \pi \cdot 12.3^2 \cdot 15$$

$$= \boxed{2376.5 \text{ cm}^3}$$

## Applications

10. Find the height of a cone with a radius of 12 inches and a volume of 1,281.12 cubic inches.

$$1281.12 = \frac{1}{3} \pi \cdot 12^2 \cdot h$$

$$1281.12 = 48\pi \cdot h$$

$$8.5 = h$$

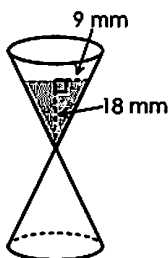
$$\boxed{8.5 \text{ in}}$$

11. Alyssa is making a candle in the shape of a square pyramid. If the base edge is 5 inches and the height is 8 inches, how much wax will she need?

$$B = 5^2 = 25$$

$$V = \frac{1}{3} \cdot 25 \cdot 8$$

$$= \boxed{66.7 \text{ in}^3}$$



12. You are playing a game in which you must answer a question before the sand in the timer falls to the bottom. If the sand is falling at a rate of 50 cubic millimeters per second, how long do you have to answer the question?

$$V = \frac{1}{3} \pi \cdot 9^2 \cdot 18$$

$$= 1526.8 \text{ mm}^3$$

$$\boxed{30.5 \text{ sec}}$$

Name: \_\_\_\_\_

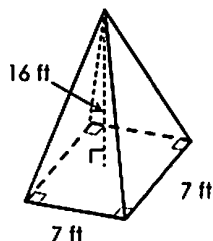
Unit 8: Measurement (Area and Volume)

Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 7: Volume of Pyramids &amp; Cones

**\*\* This is a 2-page document! \*\*****Directions:** Find the volume of each figure. Round to the nearest tenth if necessary.

1.

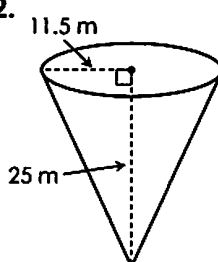


$$B = 7^2 = 49$$

$$V = \frac{1}{3} \cdot 49 \cdot 16$$

$$= \boxed{261.3 \text{ ft}^3}$$

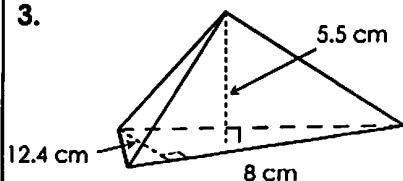
2.



$$V = \frac{1}{3} \cdot \pi \cdot 11.5^2 \cdot 25$$

$$= \boxed{3462.3 \text{ m}^3}$$

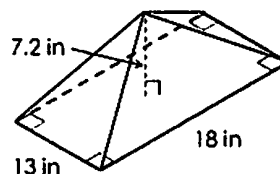
3.



$$B = \frac{1}{2} (12.4)(8) = 49.6$$

$$A = \frac{1}{3} (49.6)(5.5) = \boxed{90.9 \text{ cm}^3}$$

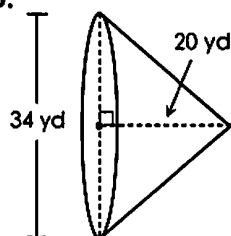
4.



$$B = 13(18) = 234$$

$$V = \frac{1}{3} (234)(7.2) = \boxed{561.6 \text{ in}^3}$$

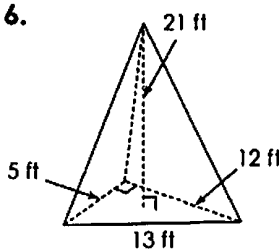
5.



$$V = \frac{1}{3} \pi \cdot 17^2 \cdot 20$$

$$= \boxed{6052.8 \text{ yd}^3}$$

6.



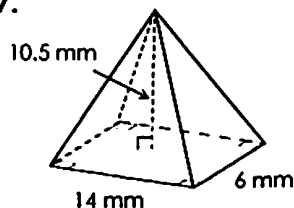
$$B = \frac{1}{2} (5)(12)$$

$$= 30$$

$$V = \frac{1}{3} (30)(21)$$

$$= \boxed{210 \text{ ft}^3}$$

7.

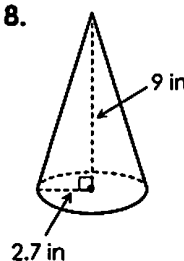


$$B = 6^2 = 36$$

$$V = \frac{1}{3} (36)(10.5)$$

$$= \boxed{294 \text{ mm}^3}$$

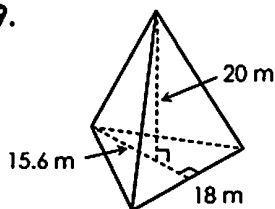
8.



$$V = \frac{1}{3} \pi \cdot 2.7^2 \cdot 9$$

$$= \boxed{68.7 \text{ in}^3}$$

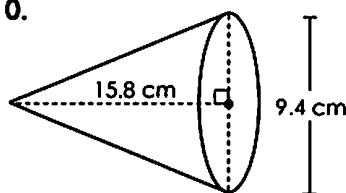
9.



$$B = \frac{1}{2}(18)(15.6) = 140.4$$

$$V = \frac{1}{3}(140.4)(20) = \boxed{936 \text{ m}^3}$$

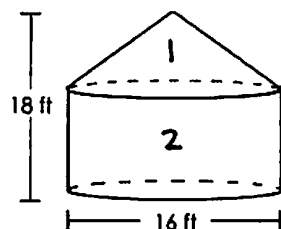
10.



$$V = \frac{1}{3}\pi \cdot 4.7^2 \cdot 15.8$$

$$= \boxed{365.5 \text{ cm}^3}$$

11. Find the volume of the solid below. Round to the nearest tenth.



$$V_1 = \frac{1}{3}\pi \cdot 8^2 \cdot 5.5$$

$$= 368.6$$

$$V_2 = \pi \cdot 8^2 \cdot 12.5$$

$$= 2513.3$$

$$V = 2899.9 \text{ ft}^3$$

12. If a cone with a diameter of 17 feet has a volume of 190.07 cubic feet, find the height of the cone.

$$190.07 = \frac{1}{3}\pi \cdot 8.5^2 \cdot h$$

$$\boxed{h = 2.5 \text{ ft}}$$

13. Find the height of a rectangular pyramid with a length of 15.8 meters, a width of 9.2 meters, and a volume of 1,235.56 cubic meters.

$$B = 15.8(9.2)$$

$$= 145.36$$

$$1235.56 = \frac{1}{3}(145.36) \cdot h$$

$$\boxed{h = 25.5 \text{ m}}$$

14. A cone-shaped icicle has a length of 18 inches and a diameter of 3 inches. If the ice is melting at a rate of 1 cubic inch every 3 minutes, how long will it take the icicle to melt?

$$V = \frac{1}{3} \cdot \pi \cdot 1.5^2 \cdot 18$$

$$= 42.4 \text{ in}^3$$

$$\frac{1 \text{ in}^3}{3 \text{ min}} = \frac{42.4 \text{ in}^3}{x \text{ min}}$$

$$x = \boxed{127.2 \text{ min}}$$

15. A cone with a diameter of 6 centimeters and a height of 8 centimeters is drilled into a wooden cube with sides measuring 8 centimeters. Find the volume of the wood that remains.

$$V_{\text{cube}} = 8 \cdot 8 \cdot 8 = 512$$

$$V_{\text{cone}} = \frac{1}{3}\pi \cdot 3^2 \cdot 8 = 75.4$$

$$512 - 75.4 = \boxed{436.6 \text{ cm}^3}$$

Name: \_\_\_\_\_

Pre-Algebra

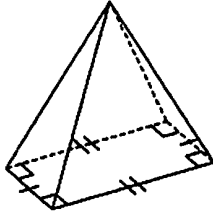
Date: \_\_\_\_\_ Per: \_\_\_\_\_

Unit 8: Measurement (Area & Volume)

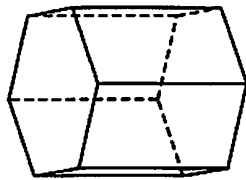
### Quiz 8-2: Classifying 3D Figures & Finding Volume

Classify each figure.

1.

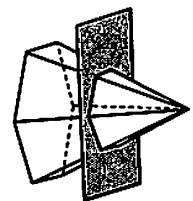
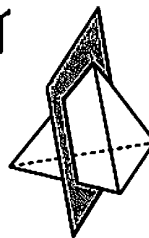
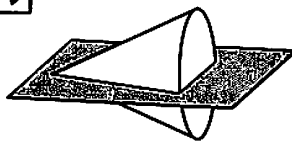
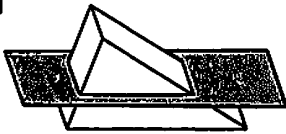


2.



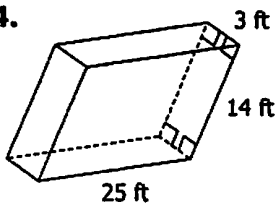
1. Rectangular  
Pyramid
2. Hexagonal  
Prism

3. Which solids have a triangular cross section? Check all that apply.



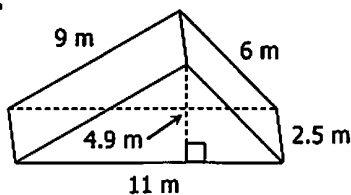
Find the volume of each figure. Round to the nearest tenth if necessary.

4.



$$V = 25(14)(3)$$

5.



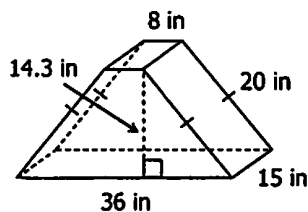
$$B = \frac{1}{2}(11)(4.9)$$

$$= 26.95$$

$$V = 26.95(2.5)$$

4. 1050 ft<sup>3</sup>
5. 67.4 m<sup>3</sup>
6. 4719 in<sup>3</sup>
7. 8595.4 cm<sup>3</sup>

6.

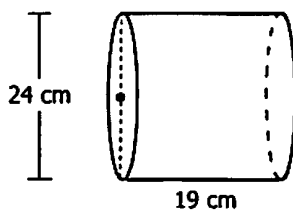


$$B = \frac{1}{2}(14.3)(8 + 36)$$

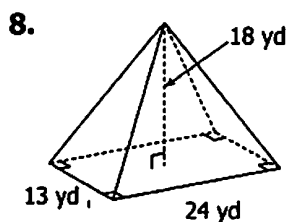
$$= 314.6$$

$$V = 314.6(15) = 4719$$

7.

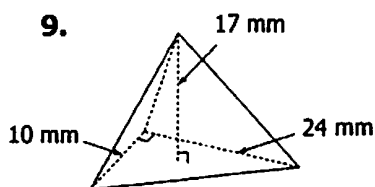


$$V = \pi \cdot 12^2 \cdot 19$$



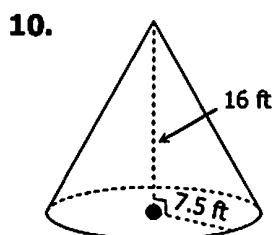
$$B = 13(24) = 312$$

$$V = \frac{1}{3}(312)(18)$$

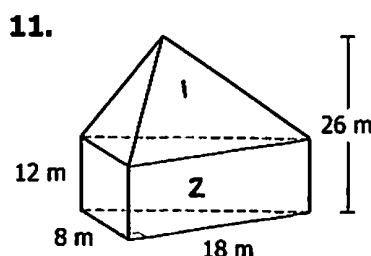


$$B = \frac{1}{2}(24)(10) = 120$$

$$V = \frac{1}{3}(120)(17)$$



$$V = \frac{1}{3}\pi \cdot 7.5^2 \cdot 16$$



$$B = \frac{1}{2}(8)(18) = 72$$

$$V_1 = \frac{1}{3}(72)(14) = 336$$

$$V_2 = 72(12) = 864$$

8. 1872 yd<sup>3</sup>

9. 680 mm<sup>3</sup>

10. 942.5 ft<sup>3</sup>

11. 1200 m<sup>3</sup>

12. 17 in

13. 4 in<sup>3</sup>

14. 57 min

12. A cone with a diameter of 12 inches has a volume of 640.88 cubic inches. Find the height of the cone.

$$640.88 = \frac{1}{3}\pi \cdot 6^2 \cdot h$$

$$640.88 = 12\pi \cdot h$$

$$h = 17$$

13. A company manufactures glass paperweights in the shape of square base pyramids. The paperweight is three inches tall and has a base-edge length of two inches. How much glass is needed to make the paperweight?

$$B = 2^2 = 4$$

$$V = \frac{1}{3}(4)(3) = 4$$

14. Jack is using a hose to fill a cylinder-shaped dunk tank with water. If the dunk tank is six feet tall and has a diameter of six feet, how long will it take to fill the tank if the hose flows at a rate of three cubic feet of water per minute? Round to the nearest minute.

$$V = \pi \cdot 3^2 \cdot 6$$

$$V = 169.6 \text{ ft}^3$$

$$\frac{169.6}{3} = 56.5$$

Name:

Date:

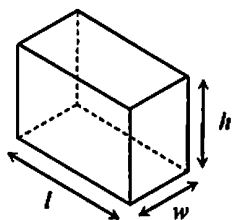
Topic:

Class:

## Main Ideas/Questions

## Notes/Examples

## Rectangular Prisms (or Cubes)

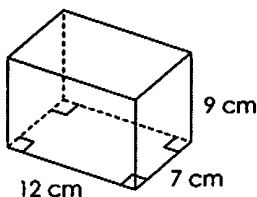


$$SA = 2lw + 2lh + 2wh$$

$l$  = length  
 $w$  = width  
 $h$  = height

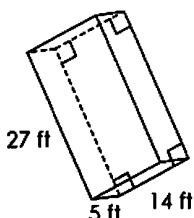
Find the surface area of each rectangular prism.

1.



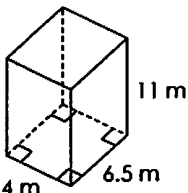
$$\begin{aligned} SA &= 2(12)(7) + 2(12)(9) + 2(7)(9) \\ &= 168 + 216 + 126 \\ &= \boxed{510 \text{ cm}^2} \end{aligned}$$

2.



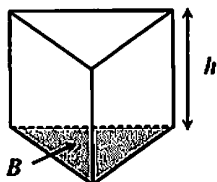
$$\begin{aligned} SA &= 2(27)(5) + 2(27)(14) + 2(5)(14) \\ &= 270 + 756 + 140 \\ &= \boxed{1166 \text{ ft}^2} \end{aligned}$$

3.



$$\begin{aligned} SA &= 2(4)(6.5) + 2(4)(11) + 2(6.5)(11) \\ &= 52 + 88 + 143 \\ &= \boxed{283 \text{ m}^2} \end{aligned}$$

## All Other Prisms



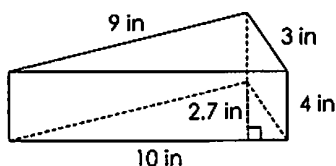
First, find the lateral area (area of non-bases), then add the area of the bases.

$$\begin{aligned} LA &= hp \\ SA &= LA + 2B \end{aligned}$$

$h$  = height between bases  
 $p$  = perimeter of the base  
 $B$  = area of the base

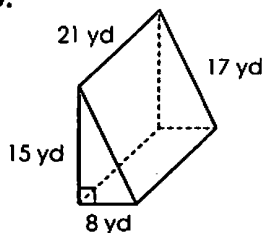
Find the surface area of each prism.

4.



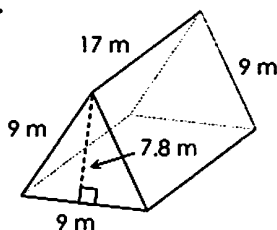
$$\begin{aligned} p &= 9 + 3 + 10 = 22 \\ LA &= 22(4) = 88 \\ B &= \frac{1}{2}(2.7)(10) = 13.5 \\ SA &= 88 + 2(13.5) = \boxed{115 \text{ in}^2} \end{aligned}$$

5.



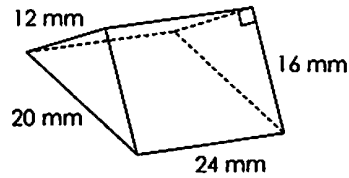
$$\begin{aligned} p &= 15 + 8 + 17 = 40 \\ LA &= 40(21) = 840 \\ B &= \frac{1}{2}(8)(15) = 60 \\ SA &= 840 + 2(60) = \boxed{960 \text{ yd}^2} \end{aligned}$$

6.



$$\begin{aligned} p &= 9 + 9 + 9 = 27 \\ LA &= 27(17) = 459 \\ B &= \frac{1}{2}(9)(7.8) = 35.1 \\ SA &= 459 + 2(35.1) = \boxed{529.2 \text{ m}^2} \end{aligned}$$

7.



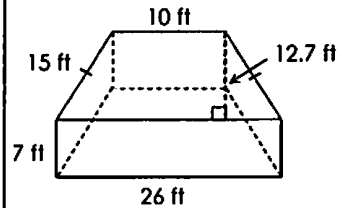
$$P = 12 + 16 + 20 = 48$$

$$LA = 48(24) = 1152$$

$$B = \frac{1}{2}(12)(16) = 96$$

$$SA = 1152 + 2(96) = \boxed{1344 \text{ mm}^2}$$

8.



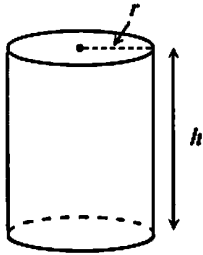
$$P = 10 + 26 + 2(15) = 66$$

$$LA = 66(7) = 462$$

$$B = \frac{1}{2}(12.7)(10 + 26) = 228.6$$

$$SA = 462 + 2(228.6) = \boxed{919.2 \text{ ft}^2}$$

## Cylinders



$$LA = 2\pi rh$$

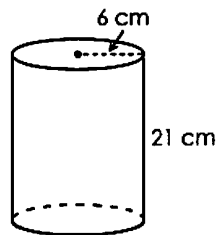
$$SA = 2\pi r^2 + 2\pi rh$$

$r$  = radius

$h$  = height

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

9.



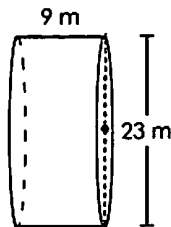
$$LA = 2\pi(6)(21)$$

$$= 791.7$$

$$SA = 2\pi(6)^2 + 791.7$$

$$= 226.2 + 791.7 = \boxed{1017.9 \text{ cm}^2}$$

10.



$$LA = 2\pi(11.5)(9)$$

$$= 650.3$$

$$SA = 2\pi(11.5)^2 + 650.3$$

$$= 831 + 650.3 = \boxed{1481.3 \text{ m}^2}$$

## Applications

11. A rectangular cake is 18 inches long, 12 inches wide, and 3 inches tall. If one jar of frosting covers 120 square inches, how many jars are needed to frost the cake?

$$SA = 2(18)(3) + 2(12)(3) + 18(12)$$

$$= 108 + 72 + 216$$

$$= 396 \text{ in}^2$$

**4 jars**

\* only one base - don't frost bottom.

12. A quarter has a diameter of approximately 24 millimeters and a height of 1.75 millimeters. What is the minimum amount of paper needed to wrap a stack 40 quarters?  $h = 40(1.75) = 70 \text{ mm}$

$$LA = 2\pi(12)(70) = 5277.9$$

$$SA = 2\pi(12)^2 + 5277.9$$

$$= 904.8 + 5277.9 = \boxed{6182.7 \text{ mm}^2}$$

Name: \_\_\_\_\_

Unit 8: Measurement (Area and Volume)



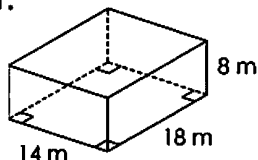
Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 8: Surface Area of Prisms &amp; Cylinders

**\*\* This is a 2-page document! \*\***

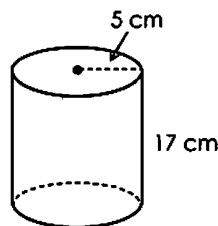
**Directions:** Find the surface area of each figure. Round to the nearest tenth if necessary.

1.



$$\begin{aligned} SA &= 2(14)(18) + 2(14)(8) + 2(18)(8) \\ &= 504 + 224 + 288 \\ &= \boxed{1016 \text{ m}^2} \end{aligned}$$

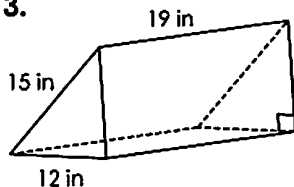
2.



$$\begin{aligned} LA &= 2\pi(5)(17) \\ &= 534.1 \end{aligned}$$

$$\begin{aligned} SA &= 2\pi(5)^2 + 534.1 \\ &= 157.1 + 534.1 = \boxed{691.2 \text{ cm}^2} \end{aligned}$$

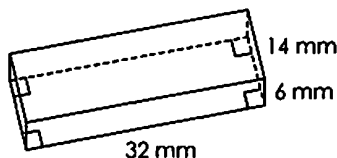
3.



$$\begin{aligned} P &= 15 + 12 + 9 = 36 \\ LA &= 36(19) = 684 \end{aligned}$$

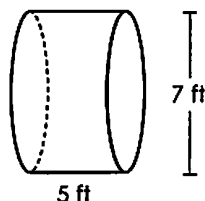
$$\begin{aligned} B &= \frac{1}{2}(12)(9) = 54 \\ SA &= 684 + 2(54) \\ &= \boxed{792 \text{ in}^2} \end{aligned}$$

4.



$$\begin{aligned} SA &= 2(32)(6) + 2(32)(14) + 2(6)(14) \\ &= 384 + 896 + 168 \\ &= \boxed{1448 \text{ mm}^2} \end{aligned}$$

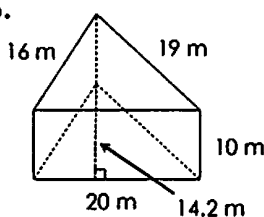
5.



$$\begin{aligned} LA &= 2\pi(3.5)(7) \\ &= 110 \end{aligned}$$

$$\begin{aligned} SA &= 2\pi(3.5)^2 + 110 \\ &= 77 + 110 \\ &= \boxed{187 \text{ ft}^2} \end{aligned}$$

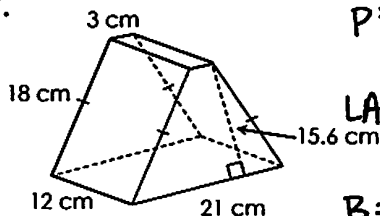
6.



$$\begin{aligned} P &= 16 + 19 + 20 = 55 \\ LA &= 55(10) = 550 \end{aligned}$$

$$\begin{aligned} B &= \frac{1}{2}(20)(14.2) = 142 \\ SA &= 2(142) + 550 \\ &= \boxed{834 \text{ m}^2} \end{aligned}$$

7.

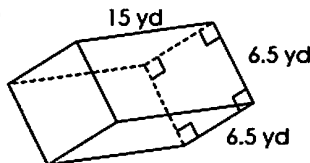


$$\begin{aligned} P &= 3 + 21 + 2(18) \\ &= 60 \end{aligned}$$

$$LA = 60(12) = 720$$

$$\begin{aligned} B &= \frac{1}{2}(12)(18) = 108 \\ SA &= 720 + 2(108) \\ &= \boxed{936 \text{ cm}^2} \end{aligned}$$

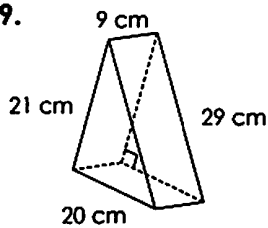
8.



$$\begin{aligned} SA &= 2(15)(6.5) + 2(15)(6.5) + 2(6.5)(6.5) \\ &= 195 + 195 + 84.5 \\ &= \boxed{474.5 \text{ yd}^2} \end{aligned}$$



9.



$$P = 21 + 20 + 29 = 70$$

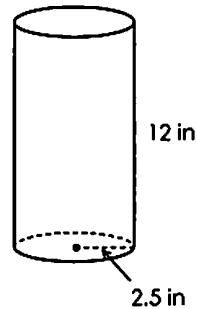
$$LA = 70(9) = 630$$

$$B = \frac{1}{2}(20)(21) = 210$$

$$SA = 2(210) + 630$$

$$= \boxed{1050 \text{ cm}^2}$$

10.

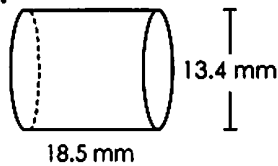


$$LA = 2\pi(2.5)(12) \\ = 188.5$$

$$SA = 2\pi(2.5)^2 + 188.5 \\ = 39.3 + 188.5$$

$$= \boxed{227.8 \text{ in}^2}$$

11.

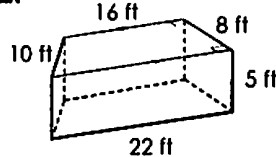


$$LA = 2\pi(18.5)(13.4) = 778.8$$

$$SA = 2\pi(18.5)^2 + 778.8$$

$$= 282.1 + 778.8 = \boxed{1060.9 \text{ mm}^2}$$

12.



$$P = 16 + 8 + 22 + 10 \\ = 56$$

$$LA = 56(5) = 280$$

$$B = \frac{1}{2}(8)(16 + 22) \\ = 152$$

$$SA = 2(152) + 280$$

$$= \boxed{584 \text{ ft}^2}$$

13. A glass fish tank in the shape of a rectangular prism has a base that measures 22 inches by 12 inches. If the tank can hold a maximum of 3,960 cubic inches of water, how much glass was used to construct the tank?

$$3960 = (22)(12) \cdot h$$

$$15 = h$$

$$SA = 2(22)(15) + 2(12)(15) + (22)(12) \leftarrow \text{No top!} \\ = 660 + 360 + 264$$

$$= \boxed{1284 \text{ in}^2}$$

14. Find the height of a cylinder if the surface area is 408.41 square inches and the radius is 5 inches.

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

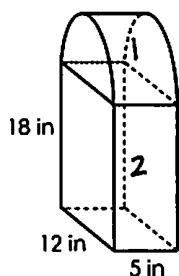
$$408.41 = 2\pi(5)^2 + 2\pi(5)h$$

$$408.41 = 50\pi + 10\pi h$$

$$251.3 = 10\pi h$$

$$\boxed{8 \text{ in} = h}$$

15. Find the surface area of the figure below. Round to the nearest tenth.



$$SA_1 = \frac{1}{2}(2\pi \cdot 6^2 + 2\pi \cdot 6 \cdot 5)$$

$$= \frac{1}{2}(414.7)$$

$$= 207.4$$

$$SA_2 = 2(12)(5) + 2(12)(18) + 2(18)(5)$$

$$= 120 + 432 + 180$$

$$= 732$$

$$\text{Total} = 207.4 + 732 - 2(60) = \boxed{819.4 \text{ in}^2}$$

Name:

Date:

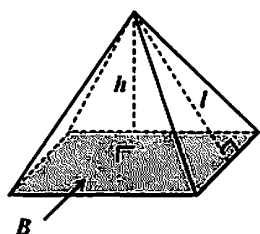
Topic:

Class:

## Main Ideas/Questions

## Notes/Examples

## Pyramids



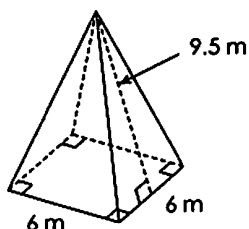
$$LA = \frac{1}{2}lp$$

$$SA = \frac{1}{2}lp + B$$

$l$  = slant height  
 $p$  = perimeter of the base  
 $B$  = area of the base

Find the surface area of each pyramid.

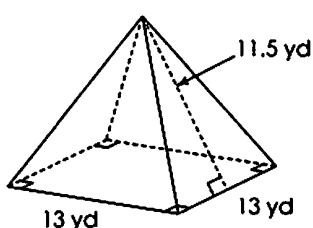
1.



$$\begin{aligned} l &= 9.5 \\ p &= 4(6) = 24 \\ B &= 6(6) = 36 \end{aligned}$$

$$SA = \frac{1}{2}(9.5)(24) + 36 = 150 \text{ m}^2$$

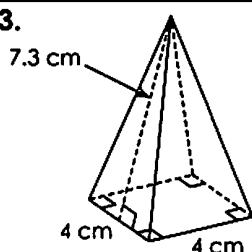
2.



$$\begin{aligned} l &= 11.5 \\ p &= 4(13) = 52 \\ B &= 13(13) = 169 \end{aligned}$$

$$SA = \frac{1}{2}(11.5)(52) + 169 = 468 \text{ yd}^2$$

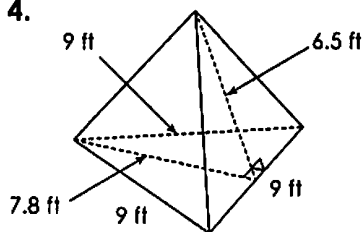
3.



$$\begin{aligned} l &= 7.3 \\ p &= 4(4) = 16 \\ B &= 4(4) = 16 \end{aligned}$$

$$SA = \frac{1}{2}(7.3)(16) + 16 = 74.4 \text{ cm}^2$$

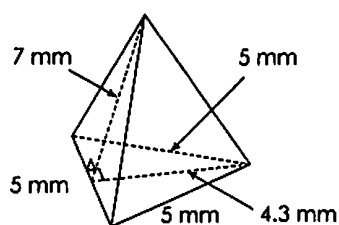
4.



$$\begin{aligned} l &= 6.5 \\ p &= 3(9) = 27 \\ B &= \frac{1}{2}(18)(9) = 35.1 \end{aligned}$$

$$SA = \frac{1}{2}(6.5)(27) + 35.1 = 122.85 \text{ ft}^2$$

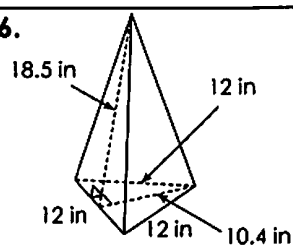
5.



$$\begin{aligned} l &= 7 \\ p &= 3(5) = 15 \\ B &= \frac{1}{2}(4.3)(5) = 10.75 \end{aligned}$$

$$SA = \frac{1}{2}(7)(15) + 10.75 = 63.25 \text{ mm}^2$$

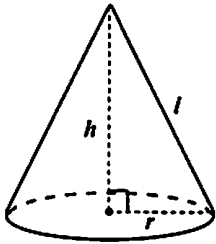
6.



$$\begin{aligned} l &= 18.5 \\ p &= 3(12) = 36 \\ B &= \frac{1}{2}(10.4)(12) = 62.4 \end{aligned}$$

$$SA = \frac{1}{2}(18.5)(36) + 62.4 = 395.4 \text{ in}^2$$

## Cones



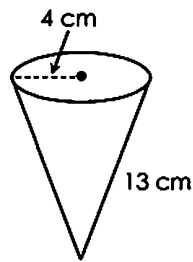
$$LA = \pi r l$$

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

$r$  = radius  
 $l$  = slant height

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

7.



$$r = 4$$

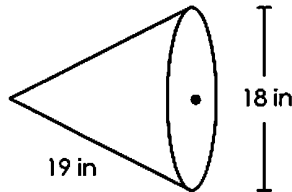
$$l = 13$$

$$SA = \pi(4)^2 + \pi(4)(13)$$

$$= 16\pi + 52\pi$$

$$= \boxed{213.6 \text{ cm}^2}$$

8.



$$r = 9$$

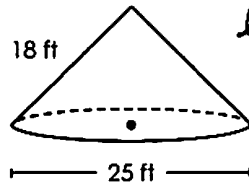
$$l = 19$$

$$SA = \pi(9)^2 + \pi(9)(19)$$

$$= 81\pi + 171\pi$$

$$= \boxed{791.7 \text{ in}^2}$$

9.



$$r = 12.5$$

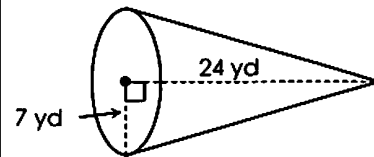
$$l = 18$$

$$SA = \pi(12.5)^2 + \pi(12.5)(18)$$

$$= 156.25\pi + 225\pi$$

$$= \boxed{1197.7 \text{ ft}^2}$$

10.



## Applications

11. Isaac is making a cone-shaped party hat out of a paper bag. If he wants the hat to be 7.5 inches tall and have a diameter of 8 inches, how much material will he need to make the hat?

$$7.5^2 + 4^2 = l^2$$

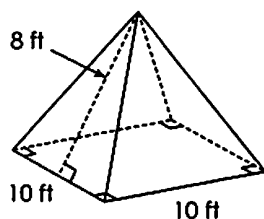
$$72.25 = l^2$$

$$8.5 = l$$

$$LA = \pi(4)(8.5) \leftarrow \text{No bottom!}$$

$$= 34\pi$$

$$= \boxed{106.8 \text{ in}^2}$$



12. A farmer is planning to put new roofing material on the roof of his work shed below. If the roofing material costs \$1.45 per square foot, how much will it cost for the material?

$$LA = \frac{1}{2} l p$$

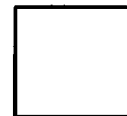
$$= \frac{1}{2}(8)(40)$$

$$= 160 \text{ ft}^2$$

$$160(1.45) = \boxed{\$232}$$

Name: \_\_\_\_\_

Unit 8: Measurement (Area and Volume)

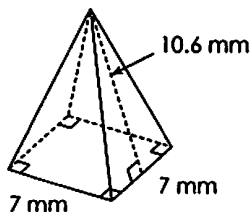


Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 9: Surface Area of Pyramids &amp; Cones

**\*\* This is a 2-page document! \*\***
**Directions:** Find the surface area of each figure. Round to the nearest tenth if necessary.

1.



$$SA = \frac{1}{2}(10.6)(28) + 49$$

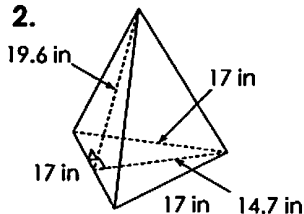
$$= 197.4 \text{ mm}^2$$

$l = 10.6$

$p = 28$

$B = 49$

2.



$$SA = \frac{1}{2}(19.6)(51)$$

$$+ 124.95$$

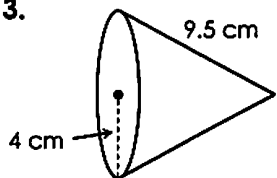
$$= 624.75 \text{ in}^2$$

$l = 19.6$

$p = 51$

$B = 124.95$

3.



$$SA = \pi(4)^2 + \pi(4)(9.5)$$

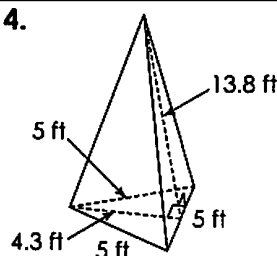
$$= 16\pi + 38\pi$$

$$= 169.6 \text{ cm}^2$$

$r = 4$

$l = 9.5$

4.



$$SA = \frac{1}{2}(13.8)(15) + 10.75$$

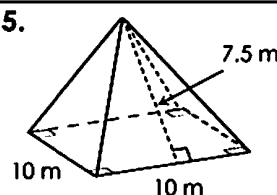
$$= 114.25 \text{ ft}^2$$

$l = 13.8$

$p = 15$

$B = 10.75$

5.



$$SA = \frac{1}{2}(7.5)(40) + 100$$

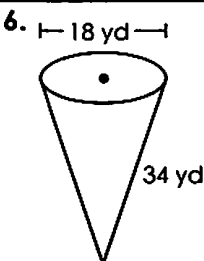
$$= 250 \text{ m}^2$$

$l = 7.5$

$p = 40$

$B = 100$

6.



$$SA = \pi(9)^2 + \pi(9)(34)$$

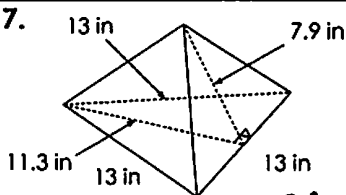
$$= 81\pi + 306\pi$$

$$= 1215.8 \text{ yd}^2$$

$r = 9$

$l = 34$

7.



$$SA = \frac{1}{2}(7.9)(39) + 73.45$$

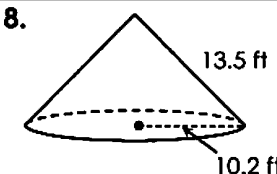
$$= 227.5 \text{ in}^2$$

$l = 7.9$

$p = 39$

$B = 73.45$

8.



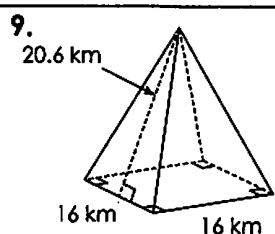
$$SA = \pi(10.2)^2 + \pi(10.2)(13.5)$$

$$= 104.04\pi + 137.7\pi$$

$$= 759.4 \text{ ft}^2$$

$r = 10.2$

$l = 13.5$



$$l = 20.6$$

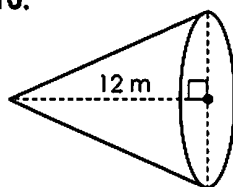
$$p = 64$$

$$B = 256$$

$$SA = \frac{1}{2}(20.6)(64) + 256$$

$$= \boxed{915.2 \text{ km}^2}$$

10.



$$r = 5$$

$$l^2 = 12^2 + 5^2 = 169$$

$$l = 13$$

$$SA = \pi(5)^2 + \pi(5)(13)$$

$$= 25\pi + 65\pi$$

$$= \boxed{282.7 \text{ m}^2}$$

11. Trent has an 8-foot tall tent in the shape of a square base pyramid with a base length of 14 feet. If one bottle of waterproof spray covers 75 square feet, how many bottles will he need to waterproof his tent?

$$l^2 = 8^2 + 7^2 = 113$$

$$l = 10.6$$

$$p = 56$$

$$B = 196$$

$$SA = \frac{1}{2}(10.6)(56) + 196$$

$$= 492.8 \text{ ft}^2$$

**7 bottles**

12. A roof in the shape of a cone has a diameter of 15 feet and a slant height of 18 feet. If one box of shingles covers 34 square feet and costs \$27, how much will it cost to cover the roof in shingles?

$$LA = \pi(7.5)(18)$$

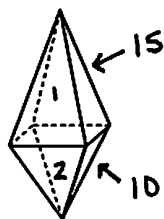
$$= 135\pi$$

$$= 424.1$$

$$13 \text{ boxes} \Rightarrow 13(27)$$

$$= \boxed{\$351}$$

13. The solid below shows two square pyramids. If the top pyramid has a slant height of 15 feet, the bottom pyramid has a slant height of 10 feet, and the base edge is 8 feet, find the surface area of the solid.



$$LA_1 = \frac{1}{2}(32)(15) = 240$$

$$LA_2 = \frac{1}{2}(32)(10) = 160$$

$$= \boxed{400 \text{ ft}^2}$$

14. A cone with a radius of 6 centimeters has a volume of 904.78 cubic centimeters. Find the surface area of the cone.

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

$$904.78 = \frac{1}{3}\pi \cdot 6^2 \cdot h$$

$$904.78 = 12\pi \cdot h$$

$$h = 24 \rightarrow l^2 = 6^2 + 24^2 = 612$$

$$l = 24.7$$

$$SA = \pi \cdot 6^2 + \pi \cdot 6 \cdot 24.7$$

$$= \boxed{578.7 \text{ cm}^2}$$

Name:

Date:

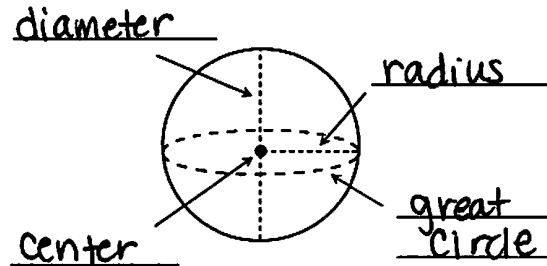
Topic:

Class:

## Main Ideas/Questions

## Notes/Examples

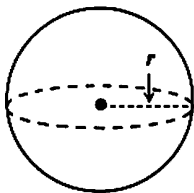
## Parts of a Sphere



A **sphere** is a solid in which each point is equidistant from a center point.

The **great circle** slices the sphere into two **hemispheres**.

## Volume &amp; Surface Area of a Sphere

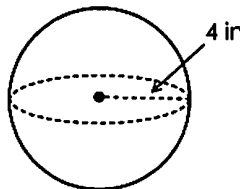


$$V = \frac{4}{3}\pi r^3$$

$$SA = 4\pi r^2$$

Find the volume of each sphere. Round to the nearest tenth.

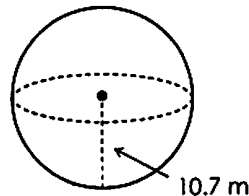
1.



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

$$= \boxed{268.1 \text{ in}^3}$$

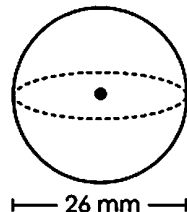
2.



$$V = \frac{4}{3}\pi(10.7)^3$$

$$= \boxed{5131.4 \text{ m}^3}$$

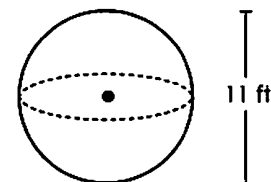
3.



$$V = \frac{4}{3}\pi(13)^3$$

$$= \boxed{9202.8 \text{ mm}^3}$$

4.

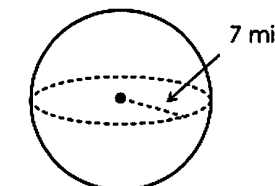


$$V = \frac{4}{3}\pi(5.5)^3$$

$$= \boxed{696.9 \text{ ft}^3}$$

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

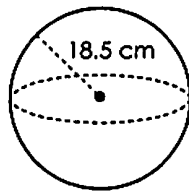
5.



$$SA = 4\pi(7)^2$$

$$= \boxed{615.8 \text{ mi}^2}$$

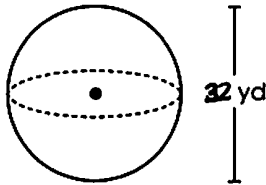
6.



$$SA = 4\pi(18.5)^2$$

$$= \boxed{4300.8 \text{ cm}^2}$$

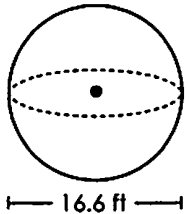
7.



$$SA = 4\pi(16)^2$$

$$= \boxed{3217 \text{ yd}^2}$$

8.



$$SA = 4\pi(8.3)^2$$

$$= \boxed{865.7 \text{ ft}^2}$$

## Applications

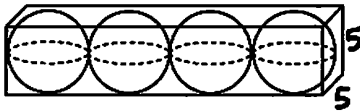
9. Find the length of the diameter of a sphere with a surface area of 1,017.88 square millimeters.

$$1017.88 = 4\pi r^2$$

$$81 = r^2$$

$$9 = r$$

$$\boxed{d = 18 \text{ mm}}$$



10. Four glass balls, each with a 2.5 inch radius, are placed in a box. If the remaining space is to be filled with cotton for padding, how much cotton is needed?

$$V_{\text{box}} = 5(5)(20) = 500$$

$$500 - 4(65.4) =$$

$$\boxed{238.4 \text{ in}^3}$$

$$V_{\text{ball}} = \frac{4}{3}\pi(2.5)^3 = 65.4$$

11. A standard basketball has a circumference of 94.25 inches. How much leather material was used to make the basketball?

$$94.25 = 2\pi r$$

$$15 = r$$

$$SA = 4\pi(15)^2$$

$$= \boxed{2827.4 \text{ in}^2}$$

12. Find the volume of the solid to the left if the cone has a diameter of 6 feet and a height of 11 feet.

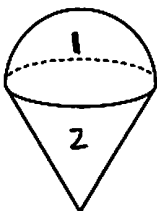
$$V_1 = \frac{1}{2} \left[ \frac{4}{3}\pi(3)^3 \right]$$

$$= 56.5$$

$$V_2 = \frac{1}{3}\pi(3)^2 \cdot 11$$

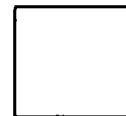
$$= 103.7$$

$$V = \boxed{160.2 \text{ ft}^3}$$



Name: \_\_\_\_\_

Unit 8: Measurement (Area and Volume)

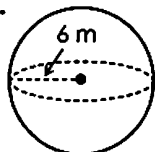


Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 10: Volume &amp; Surface Area of Spheres

**Directions:** Find the **volume** of each sphere. Round to the nearest tenth.

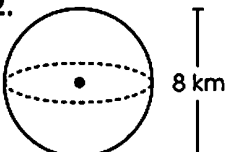
1.



$$V = \frac{4}{3} \pi (6)^3$$

$$= \boxed{904.8 \text{ m}^3}$$

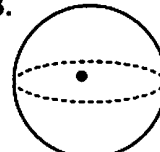
2.



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

$$= \boxed{268.1 \text{ km}^3}$$

3.

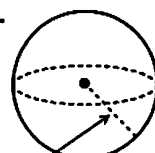


$$V = \frac{4}{3} \pi (9.2)^3$$

$$= \boxed{3261.8 \text{ in}^3}$$

**Directions:** Find the **surface area** of each sphere. Round to the nearest tenth.

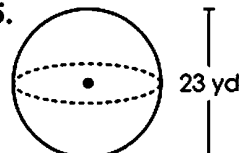
4.



$$SA = 4\pi (14.5)^2$$

$$= \boxed{2642.1 \text{ cm}^2}$$

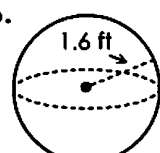
5.



$$SA = 4\pi (11.5)^2$$

$$= \boxed{1661.9 \text{ yd}^2}$$

6.



$$SA = 4\pi (1.6)^2$$

$$= \boxed{32.2 \text{ ft}^2}$$

7. As part of a school science project, Caroline needs to make a model of planet Earth with a 7-inch diameter using playdough. If one container of playdough contains 9 cubic inches, how many containers will she need?

$$V = \frac{4}{3} \pi (3.5)^3$$

$$= 179.6 \text{ in}^3$$

20 containers

8. Find the surface area of a sphere with a volume of 33.51 cubic inches.

$$33.51 = \frac{4}{3} \pi r^3$$

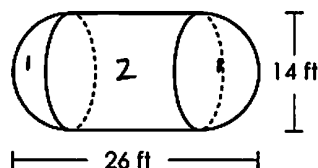
$$8 = r^3$$

$$2 = r$$

$$SA = 4\pi (2)^2$$

$$= \boxed{50.3 \text{ in}^2}$$

9. Find the total surface area of the solid below.



$$SA_1 = 4\pi (7)^2$$

$$= 615.8$$

$$LA_2 = 2\pi (7)(14)$$

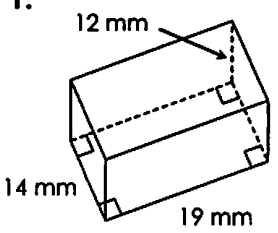
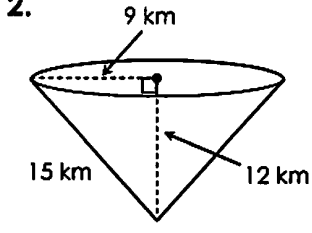
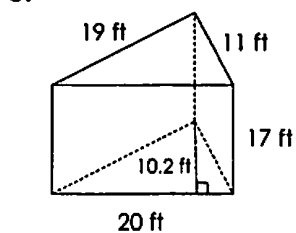
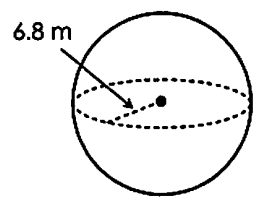
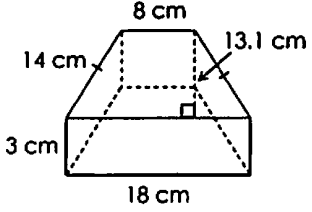
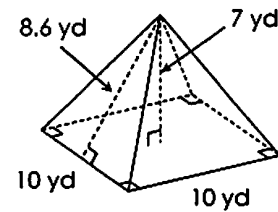
$$= 527.8$$

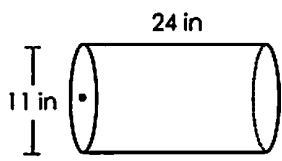
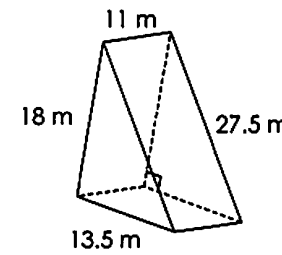
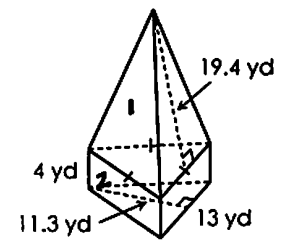
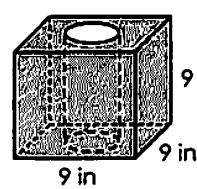
$$\text{Total} = \boxed{1143.6 \text{ ft}^2}$$



# VOLUME & SURFACE AREA

*Round answers to the nearest tenth when necessary!*

FIGURE	VOLUME	SURFACE AREA
<p>1.</p> 	$V = 14(19)(12)$ $= \boxed{3192 \text{ mm}^3}$	$SA = 2(14)(19) + 2(14)(12)$ $+ 2(19)(12)$ $= \boxed{1324 \text{ mm}^2}$
<p>2.</p> 	$V = \frac{1}{3} \pi (9)^2 (15)$ $= \boxed{1017.9 \text{ km}^3}$	$SA = \pi (9)^2 + \pi (9)(15)$ $= \boxed{678.6 \text{ km}^2}$
<p>3.</p> 	$B = \frac{1}{2} (20)(10.2)$ $= 102$ $V = 102(17)$ $= \boxed{1734 \text{ ft}^3}$	$SA = 17(50) + 2(102)$ $= \boxed{1054 \text{ ft}^2}$
<p>4.</p> 	$V = \frac{4}{3} \pi (6.8)^3$ $= \boxed{1317.1 \text{ m}^3}$	$SA = 4\pi (6.8)^2$ $= \boxed{581.1 \text{ m}^2}$
<p>5.</p> 	$B = \frac{1}{2} (13.1)(8 + 18)$ $= 170.3$ $V = 170.3(3)$ $= \boxed{510.9 \text{ cm}^3}$	$SA = 3(54) + 2(170.3)$ $= \boxed{502.6 \text{ cm}^2}$
<p>6.</p> 	$B = 10(10) = 100$ $V = \frac{1}{3} (100)(7)$ $= \boxed{233.3 \text{ yd}^3}$	$SA = \frac{1}{2} (8.6)(40) + 100$ $= \boxed{272 \text{ yd}^2}$

<p>7.</p> 	$V = \pi (5.5)^2 (24)$ $= \boxed{2280.8 \text{ in}^3}$	$SA = 2\pi (5.5) + 2\pi (5.5) (24)$ $= \boxed{863.9 \text{ in}^2}$
<p>8.</p> 	$B = \frac{1}{2} (18) (13.5)$ $= 121.5$ $V = 121.5 (11)$ $= \boxed{1336.5 \text{ m}^3}$	$SA = 11 (59) + 2 (121.5)$ $= \boxed{892 \text{ m}^2}$
<p>9. If the surface area of a sphere is 530.93 square centimeters, find the volume of the sphere.</p> <div style="display: flex; justify-content: space-around;"> <div> <math display="block">530.93 = 4\pi r^2</math> <math display="block">42.25 = r^2</math> <math display="block">6.5 = r</math> </div> <div> <math display="block">V = \frac{4}{3} \pi (6.5)^3</math> <math display="block">= \boxed{1150.3 \text{ cm}^3}</math> </div> </div>		
<p>10. If a cone with a height of 15 inches has a volume of 5,089.38 cubic feet, find the length of its diameter</p> <div style="display: flex; justify-content: space-between;"> <div> <math display="block">5089.38 = \frac{1}{3} \pi r^2 (15)</math> <math display="block">5089.38 = 5\pi r^2</math> <math display="block">324 = r^2</math> <math display="block">18 = r</math> </div> <div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>diameter = 36 ft</p> </div> </div>		
<p>11. Find the surface area of the figure below.</p> <div style="display: flex; justify-content: space-between;"> <div>  <math display="block">SA_1 = \frac{1}{2} (19.4) (39) \leftarrow \text{No base!}</math> <math display="block">= 378.3 \text{ yd}^2</math> </div> <div> <math display="block">B = \frac{1}{2} (13) (11.3) = 73.45</math> <math display="block">SA_2 = 4 (39) + 73.45</math> <math display="block">= 229.45 \text{ yd}^2 \text{ only one base!}</math> </div> </div> <div style="text-align: center; margin-top: 10px;"> <p>Total = <span style="border: 1px solid black; padding: 5px;">607.75 yd<sup>2</sup></span></p> </div>		
<p>12. A cylinder with a 3.5-inch diameter is drilled into the wooden cube below. If the wood weighs 6 grams per cubic inch, find the weight of the cube.</p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div>  <math display="block">V_{\text{cube}} = 9(9)(9) = 729</math> <math display="block">V_{\text{cyl}} = \pi (1.75)^2 (9) = 86.6</math> <math display="block">\text{Volume} = 729 - 86.6 = 642.4 \text{ in}^3</math> </div> <div style="border: 1px solid black; padding: 10px; text-align: center; width: 30%;"> <p>Weight = 3854.4 grams</p> </div> </div>		

Name: \_\_\_\_\_

Unit 8: Measurement (Area and Volume)



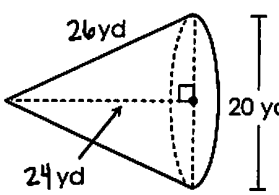
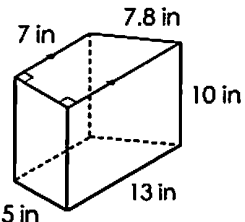
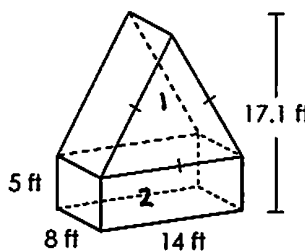
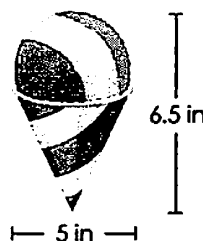
Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 11: Volume &amp; Surface Area Review

**\*\* This is a 2-page document! \*\***

Find the volume and surface area of each figure. Round to the nearest tenth if necessary.

Figure	Volume	Surface Area
<p>1.</p>	$V = \pi (13)^2 (8)$ $= 4247.4 \text{ mm}^3$	$SA = 2\pi (13)^2 + 2\pi (13)(8)$ $= 338\pi + 208\pi$ $= 1715.3 \text{ mm}^2$
<p>2.</p>	$V = 11(16)(2.5)$ $= 440 \text{ ft}^3$	$SA = 2(11)(16) + 2(11)(2.5)$ $+ 2(16)(2.5)$ $= 487 \text{ ft}^2$
<p>3.</p>	$B = \frac{1}{2}(18)(24) = 216$ $V = 216(8)$ $= 1728 \text{ mi}^3$	$SA = 8(72) + 2(216)$ $= 1008 \text{ mi}^2$
<p>4.</p>	$B = 14^2 = 196$ $V = \frac{1}{3}(196)(23.8)$ $= 1554.9 \text{ m}^3$	$SA = \frac{1}{2}(25)(56) + 196$ $= 896 \text{ m}^2$
<p>5.</p>	$V = \frac{4}{3}\pi (8.5)^3$ $= 2572.4 \text{ cm}^3$	$SA = 4\pi (8.5)^2$ $= 907.9 \text{ cm}^2$

<p>6.</p> 	$V = \frac{1}{3} \pi (10)^2 (24)$ $= 2513.3 \text{ yd}^3$	$SA = \pi (10)^2 + \pi (10)(26)$ $= 100\pi + 260\pi$ $= 1131 \text{ yd}^2$
<p>7.</p> 	$B = \frac{1}{2} (5)(7+13) = 50$ $V = 50(10)$ $= 500 \text{ in}^3$	$SA = 10(32.8) + 2(50)$ $= 428 \text{ in}^2$
<p>8. Find the surface area of the figure below.</p>  <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <math display="block">SA_1 = (8)(42) + 2(84.7)</math> <math display="block">= 505.4</math> <math display="block">SA_2 = 2(5)(8) + 2(5)(14) + 2(8)(14)</math> <math display="block">= 444</math> </div> <div style="width: 45%;"> <math display="block">B_1 = \frac{1}{2} (14)(12.1)</math> <math display="block">= 84.7</math> </div> </div> $SA = 505.4 + 444 - 2(112) = 725.4 \text{ ft}^2$		
<p>9. If Maggie's snow cone maker can make 800 cubic inches of ice, how many snow cones can she make with the dimensions shown below?</p>  <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <math display="block">r = 2.5</math> <math display="block">V = \frac{4}{3} \pi (2.5)^3</math> <math display="block">= 65.4 \text{ in}^3</math> </div> <div style="width: 45%; text-align: center;"> <div style="border: 1px solid black; padding: 10px; display: inline-block;"> <p>12 snow cones</p> </div> </div> </div>		
<p>10. A cylinder with a diameter of 10 millimeters has a surface area of 439.83 square millimeters. Find the volume of the cylinder.</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <math display="block">439.83 = 2\pi (5)^2 + 2\pi (5)h</math> <math display="block">439.83 = 50\pi + 10\pi h</math> <math display="block">282.75 = 10\pi h</math> <math display="block">9 = h</math> </div> <div style="width: 45%;"> <math display="block">V = \pi (5)^2 (9)</math> <math display="block">= 225\pi</math> <math display="block">= 706.9 \text{ mm}^3</math> </div> </div>		

Name:

Date:

Topic:

Class:

Main Ideas/Questions

Notes/Examples

## Effects of CHANGING A DIMENSION

### Example 1

➤ What do you think will happen to the **volume of a cylinder** if you **double its height**? \_\_\_\_\_

➤ Use test numbers to calculate both the old and new volume:

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

$$\begin{aligned} V &= \pi (1)^2 (1) \\ &= \pi \end{aligned}$$

$$\begin{aligned} V &= \pi (1)^2 (2) \\ &= 2\pi \end{aligned}$$

➤ How does the new volume compare to the old volume?  
\_\_\_\_\_ **doubled** \_\_\_\_\_

### Example 2

➤ What do you think will happen to the **volume of a cylinder** if you **double its radius**? \_\_\_\_\_

➤ Use test numbers to calculate both the old and new volume:

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

$$\begin{aligned} V &= \pi (1)^2 \cdot 1 \\ &= \pi \end{aligned}$$

$$\begin{aligned} V &= \pi (2)^2 \cdot 1 \\ &= 4\pi \end{aligned}$$

➤ How does the new volume compare to the old volume?

\_\_\_\_\_ **four times as big** ( $r^2 \rightarrow (2)^2 = 4$ ) \_\_\_\_\_

### More Examples

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

3. How does the volume of a cone change if the radius is tripled?

$$r = 1, h = 1 \rightarrow r = 3, h = 1$$

$$\begin{aligned} V &= \frac{1}{3} \pi (1)^2 (1) & V &= \frac{1}{3} \pi (3)^2 (1) \\ &= \frac{1}{3} \pi & &= 3\pi \end{aligned}$$

**9 times larger**

4. How does the volume of a square pyramid change if the base edge is multiplied by 6?

$$V = \frac{1}{3} B h \quad (B = s^2)$$

$$s = 1, h = 1 \rightarrow s = 6, h = 1$$

$$\begin{aligned} V &= \frac{1}{3} (1)^2 (1) & V &= \frac{1}{3} (6)^2 (1) \\ &= \frac{1}{3} & &= 12 \end{aligned}$$

**36 times larger**

5. How does the volume of a sphere change if radius is multiplied by 5?

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

$$r = 1$$

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

$$= \frac{4}{3}\pi$$

$$r = 5$$

$$V = \frac{4}{3}\pi(5)^3$$

$$= \frac{500}{3}\pi$$

125 times larger

6. How does the surface area of a sphere change if the radius is multiplied by 1/2?

$$SA = 4\pi r^2$$

$$r = 2$$

$$SA = 4\pi(2)^2$$

$$= 16\pi$$

→

$$r = 1$$

$$SA = 4\pi(1)^2$$

$$= 4\pi$$

1/4<sup>th</sup> as large

7. How does the surface area of a cube change if the side length is multiplied by 1/3?

$$SA = 6 \cdot s^2$$

$$s = 3$$

$$SA = 6 \cdot 3^2$$

$$= 54$$

→

$$s = 1$$

$$SA = 6 \cdot 1^2$$

$$= 6$$

1/9<sup>th</sup> as large

8. How does the volume of a cylinder change if the diameter is multiplied by 1/4?

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

$$r = 4, h = 1 \rightarrow$$

$$V = \pi(4)^2(1)$$

$$= 16\pi$$

$$r = 1, h = 1$$

$$V = \pi(1)^2(1)$$

$$= \pi$$

$$d = 8 \rightarrow d = 2$$

$$r = 4 \rightarrow r = 1$$

1/16<sup>th</sup> as large

Finding new Measures

9. The volume of a rectangular prism is 400 m<sup>3</sup>. If its length is doubled, what will be the new volume?

$$V = l \cdot w \cdot h$$

↓

2

$$400(2)$$

$$= 800\text{m}^3$$

10. The volume of a cone is 864 cm<sup>3</sup>. If its radius is multiplied by 1/2, what will be the new volume of the cone?

$$r^2 = 1/4$$

$$864 \cdot 1/4 = 216\text{cm}^3$$

Name: \_\_\_\_\_

Unit 8: Measurement (Area and Volume)



Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 12: Effects of Changing a Dimension

1. How does the volume of a rectangular prism change if its width is multiplied by 4?

$$V = l \cdot w \cdot h$$

↓

4 times larger

2. How does the volume of a sphere change if its radius is doubled?

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

↓

$$(2)^3 = 8$$

8 times larger

3. How does the volume of a cone change if its radius is multiplied by  $1/3$ ?

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

↓

$$(1/3)^2 = 1/9$$

$1/9^{\text{th}}$  as large

4. How does the surface area of a cube change if its side length is multiplied by  $1/5$ ?

$$SA = 6 \cdot s^2$$

↓

$$(1/5)^2 = 1/25$$

$1/25^{\text{th}}$  as large

5. How does the volume of a cylinder change if its diameter is multiplied by 6?

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

↓

$$(6)^2 = 36$$

$$d \rightarrow d=6$$

$$r=1/2 \rightarrow r=3$$

36 times larger

6. How does the volume of a triangular prism change if its height is cut in half?

$$V = B \cdot h$$

↓

$$1/2$$

$1/2$  as large

7. The surface area of a sphere is  $205 \text{ in}^2$ . If its radius is tripled, what will be the new surface area of the sphere?

$$SA = 4\pi r^2$$

↓

$$(3)^2 = 9$$

$$205(9) = \boxed{1845 \text{ in}^2}$$

8. The volume of a cylinder is  $1,200 \text{ yd}^3$ . If its height is multiplied by  $1/4$ , what will be the new volume of the cylinder?

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

↓

$$1/4$$

$$1200(1/4) = \boxed{300 \text{ yd}^3}$$

Name: \_\_\_\_\_

Pre-Algebra

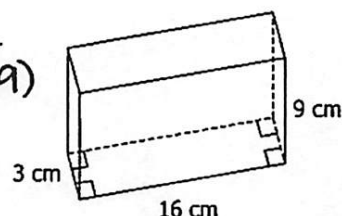
Date: \_\_\_\_\_ Per: \_\_\_\_\_

Unit 8: Measurement (Area &amp; Volume)

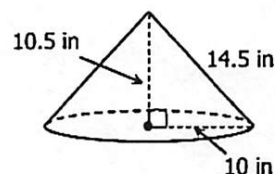
**Quiz 8-3: Volume & Surface Area**

Find the volume and surface area of each figure. Round to the tenths place when necessary.

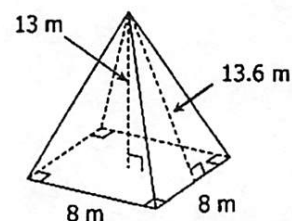
1.  $V = \underline{432 \text{ cm}^3}$ ;  $SA = \underline{438 \text{ cm}^2}$   
 $V = 3(16)(9)$   $SA = 2(3)(16) + 2(3)(9) + 2(16)(9)$



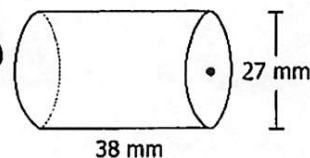
2.  $V = \underline{1099.6 \text{ in}^3}$ ;  $SA = \underline{769.7 \text{ in}^2}$   
 $V = \frac{1}{3}\pi(10)^2(10.5)$   $SA = \pi(10)^2 + \pi(10)(14.5)$



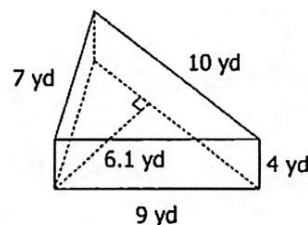
3.  $V = \underline{277.3 \text{ m}^3}$ ;  $SA = \underline{281.6 \text{ m}^2}$   
 $B = 8^2 = 64$   $SA = \frac{1}{2}(13.6)(32) + 64$   
 $V = \frac{1}{3}(64)(13)$



4.  $V = \underline{21,757.1 \text{ mm}^3}$ ;  $SA = \underline{4368.4 \text{ mm}^2}$   
 $V = \pi(13.5)^2(38)$   $SA = 2\pi(13.5)^2 + 2\pi(13.5)(38)$



5.  $V = \underline{122 \text{ yd}^3}$ ;  $SA = \underline{165 \text{ yd}^2}$   
 $B = \frac{1}{2}(10)(6.1) = 30.5$   $SA = 4(26) + 2(30.5)$   
 $V = 30.5(4)$





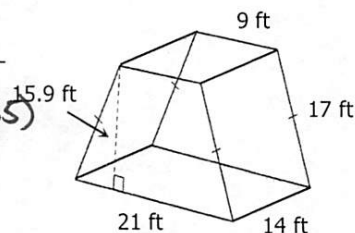
6.  $V = 3339 \text{ ft}^3$ ;  $SA = 1373 \text{ ft}^2$

$$B = \frac{1}{2} (15.9)(9+21)$$

$$= 238.5$$

$$V = 238.5(14)$$

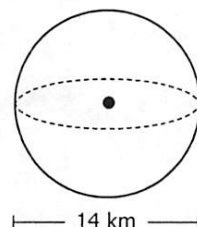
$$SA = 14(64) + 2(238.5)$$



7.  $V = 1436.8 \text{ km}^3$ ;  $SA = 615.8 \text{ km}^2$

$$V = \frac{4}{3} \pi (7)^3$$

$$SA = 4\pi (7)^2$$



8. A cone with a diameter of 8 inches has a volume of 217.82 cubic inches. Find the surface area of the cone.

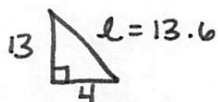
8.  $221.2 \text{ in}^2$

$$217.82 = \frac{1}{3} \pi (4)^2 \cdot h$$

$$SA = \pi (4)^2 + \pi (4)(13.6)$$

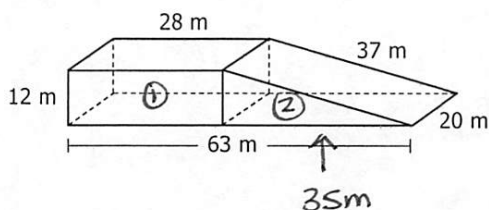
$$217.82 = \frac{16}{3} \pi \cdot h$$

$$h = 13$$



9. Find the total volume of the figure below.

9.  $10920 \text{ m}^3$



$$V_1 = 12(20)(28)$$

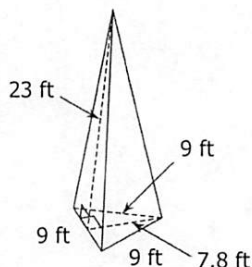
$$= 6720$$

$$B_2 = \frac{1}{2} (12)(35) = 210$$

$$V_2 = 210(20) = 4200$$

10. A new monument with dimensions shown below was built at the entrance to city hall. The mayor would like to hold a ceremony to unveil the monument. What is the minimum amount of fabric needed to cover the monument?

10.  $310.5 \text{ ft}^2$



$$LA = \frac{1}{2} (23)(27)$$

Name:	Date:
Topic:	Class:

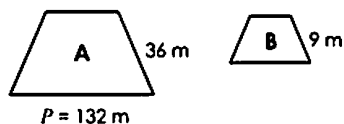
Main Ideas/Questions	Notes/Examples
<p style="text-align: center;">Review:</p> <h2 style="text-align: center; margin: 0;">SIMILAR FIGURES</h2>	<ul style="list-style-type: none"> <li>Similar figures have the same <u>shape</u> but a different <u>size</u>.</li> <li>If two figures are similar, then their corresponding <u>angles</u> are <u>congruent</u> and the <u>ratio</u> of their corresponding <u>sides</u> are <u>proportional</u>.</li> <li>This ratio is called the <u>scale factor</u>.</li> </ul> <p><b>Give the scale factor of Figure A to Figure B.</b></p> <div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>1.</p> <p><math>\frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{1}{2}</math></p> </div> <div style="width: 45%;"> <p>2.</p> <p><math>\frac{16}{12} = \frac{28}{21} = \frac{20}{12} = \frac{4}{3}</math></p> </div> </div>
<h2 style="text-align: center; margin: 0;">PERIMETER &amp; AREA</h2> <p style="text-align: center;">of Similar Figures</p>	<p>If two figures are similar with a scale factor of <u>a:b</u>, then their perimeter and area ratios are as follows:</p> <p style="text-align: center;">Perimeter: <u>a:b</u>; Area: <u>a<sup>2</sup>:b<sup>2</sup></u></p> <p><b>Assuming the figures are similar, give the scale factor, perimeter ratio, and area ratio of Figure A to Figure B.</b></p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>3.</p> </div> <div style="width: 50%;"> <p><math>\frac{15}{5} = 3</math> Scale Factor: <u>3:1</u></p> <p>Perimeter Ratio: <u>3:1</u></p> <p>Area Ratio: <u>9:1</u></p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>4.</p> </div> <div style="width: 50%;"> <p><math>\frac{18}{63} = \frac{2}{7}</math> Scale Factor: <u>2:7</u></p> <p>Perimeter Ratio: <u>2:7</u></p> <p>Area Ratio: <u>4:49</u></p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>5.</p> </div> <div style="width: 50%;"> <p><math>\frac{75}{48} = \frac{25}{16}</math> Scale Factor: <u>5:4</u></p> <p>Perimeter Ratio: <u>5:4</u></p> <p>Area Ratio: <u>25:16</u></p> </div> </div>

# FINDING MEASURES

•Use Proportions!•

Assume each pair of figures are similar.

6. Find the perimeter of Figure B.

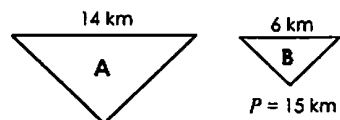


$$\frac{36}{9} = \frac{4}{1} \quad \frac{4}{1} = \frac{132}{x}$$

$$4x = 132$$

$$x = 33 \text{ m}$$

7. Find the perimeter of Figure A.

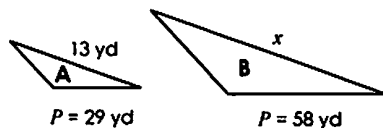


$$\frac{14}{6} = \frac{7}{3} \quad \frac{7}{3} = \frac{x}{15}$$

$$3x = 105$$

$$x = 35 \text{ km}$$

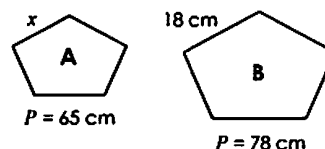
8. Find x.



$$\frac{13}{58} = \frac{1}{2} \quad \frac{13}{x} = \frac{1}{2}$$

$$x = 26 \text{ yd}$$

9. Find x.

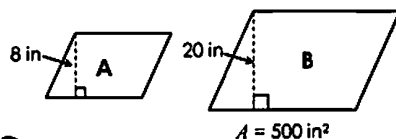


$$\frac{65}{78} = \frac{5}{6} \quad \frac{5}{6} = \frac{x}{18}$$

$$6x = 90$$

$$x = 15 \text{ cm}$$

10. Find the area of Figure A.

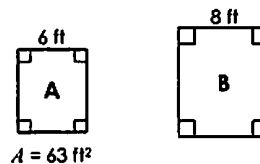


$$\frac{8}{20} = \frac{2}{5} \quad \frac{4}{25} = \frac{x}{500}$$

$$25x = 2000$$

$$x = 80 \text{ in}^2$$

11. Find the area of Figure B.

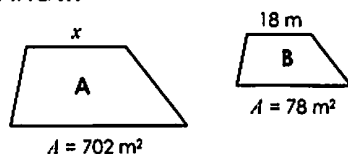


$$\frac{6}{8} = \frac{3}{4} \quad \frac{9}{16} = \frac{63}{x}$$

$$9x = 1008$$

$$x = 112 \text{ ft}^2$$

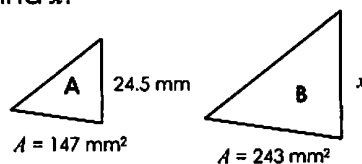
12. Find x.



$$\frac{702}{78} = \frac{9}{1} \quad \frac{3}{1} = \frac{x}{18}$$

$$x = 54 \text{ m}$$

13. Find x.



$$\frac{147}{243} = \frac{49}{81} \quad \frac{7}{9} = \frac{24.5}{x}$$

$$7x = 220.5$$

$$x = 31.5 \text{ mm}$$

14. The area of Figure A is 176 ft² and the area of Figure B is 275 ft². If the perimeter of Figure A is 52 ft, find the perimeter of Figure B.

$$\frac{176}{275} = \frac{16}{25} \quad \frac{4}{5} = \frac{52}{x}$$

$$4x = 260$$

$$x = 65 \text{ ft}$$

Name: \_\_\_\_\_

Unit 8: Measurement (Area and Volume)

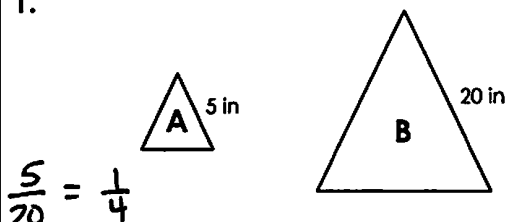


Date: \_\_\_\_\_ Per: \_\_\_\_\_

Homework 13: Perimeter &amp; Area of Similar Figures

**\*\* This is a 2-page document! \*\***
**Assuming the figures are similar, identify the scale factor, perimeter ratio, and area ratio of Figure A to Figure B.**

1.



Scale Factor

1:4

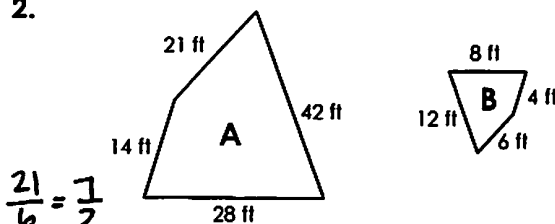
Perimeter Ratio

1:4

Area Ratio

1:16

2.



Scale Factor

7:2

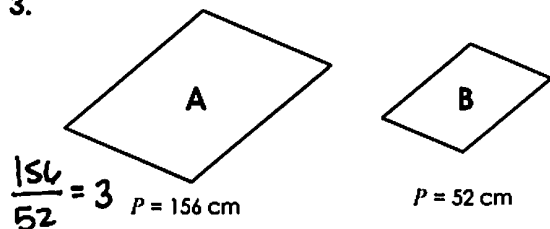
Perimeter Ratio

7:2

Area Ratio

49:4

3.



Scale Factor

3:1

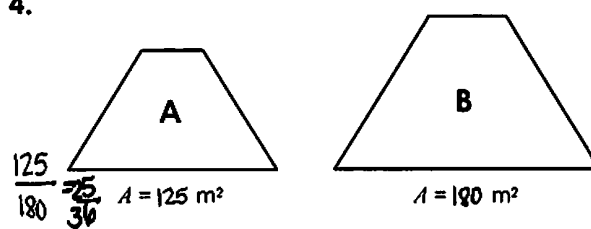
Perimeter Ratio

3:1

Area Ratio

9:1

4.



Scale Factor

5:6

Perimeter Ratio

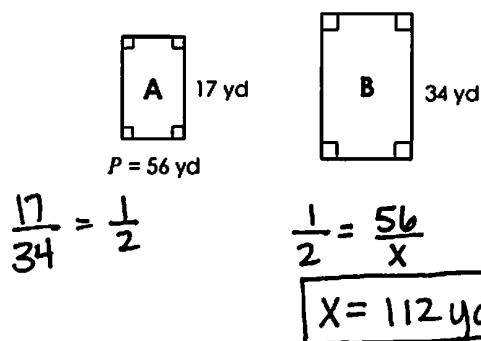
5:6

Area Ratio

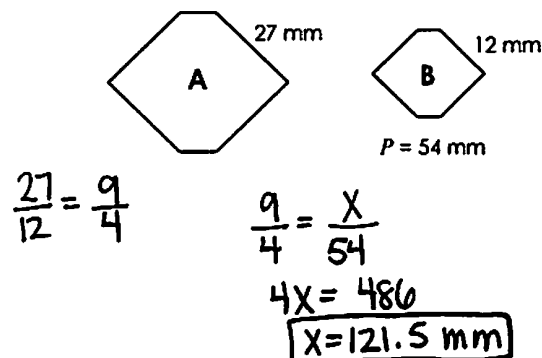
25:36

**Assume each pair of figures are similar.**

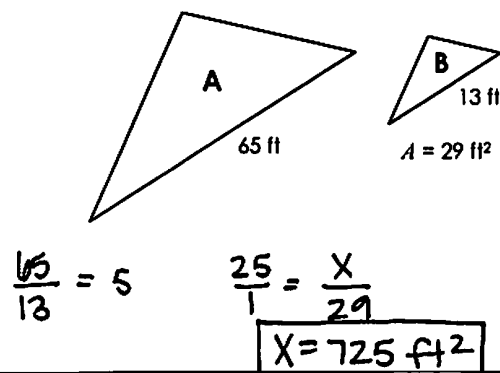
5. Find the perimeter of Figure B.



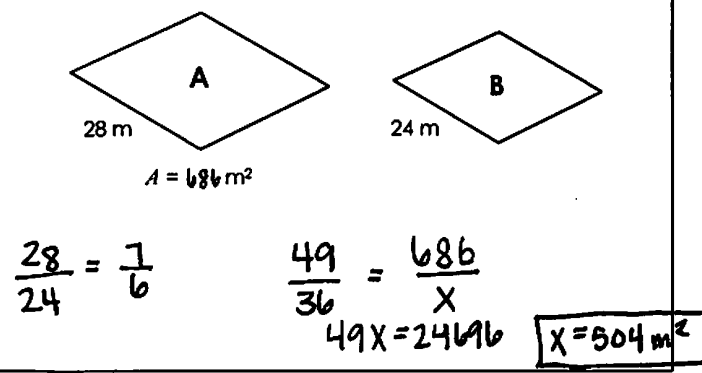
6. Find the perimeter of Figure A.



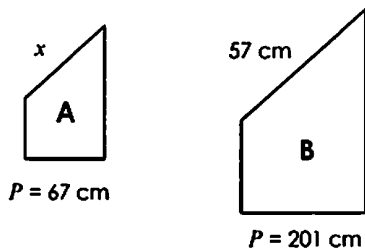
7. Find the area of Figure A.



8. Find the area of Figure B.



9. Find x.



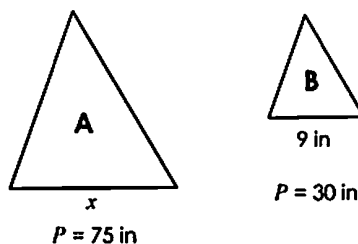
$$\frac{67}{201} = \frac{1}{3}$$

$$\frac{1}{3} = \frac{x}{57}$$

$$3x = 57$$

$$x = 19 \text{ cm}$$

10. Find x.



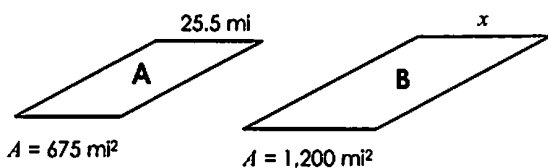
$$\frac{75}{30} = \frac{5}{2}$$

$$\frac{5}{2} = \frac{x}{9}$$

$$2x = 45$$

$$x = 22.5 \text{ in}$$

11. Find x.



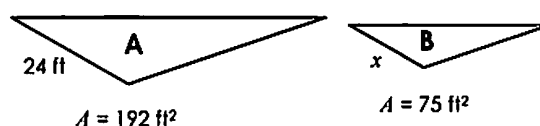
$$\frac{675}{1200} = \frac{9}{16}$$

$$\frac{3}{4} = \frac{25.5}{x}$$

$$3x = 102$$

$$x = 34 \text{ mi}$$

12. Find x.



$$\frac{192}{75} = \frac{64}{25}$$

$$\frac{8}{5} = \frac{24}{x}$$

$$8x = 120$$

$$x = 15 \text{ ft}$$

13. The ratio of the heights of two similar triangles is 6:5. If the perimeter of the larger triangle is 49.2 feet, find the perimeter of the smaller triangle.

$$\frac{6}{5} = \frac{49.2}{x}$$

$$6x = 246$$

$$x = 41$$

$$41 \text{ ft}$$

14. The ratio of the areas of two similar parallelograms is 4:1. If the base of the smaller parallelogram is 28 centimeters, find the base length of the larger parallelogram.

$$\frac{4}{1}$$

$$\frac{2}{1} = \frac{x}{28}$$

$$x = 56$$

$$56 \text{ cm}$$

15. The perimeter of Figure A is 56 in and the perimeter of Figure B is 8 in. If the figures are similar and the area of Figure A is 294 in², find the area of Figure B.

$$\frac{56}{8} = \frac{7}{1}$$

$$\frac{49}{1} = \frac{294}{x}$$

$$49x = 294$$

$$x = 6 \text{ in}^2$$

16. The area of Figure A is 84 mm² and the area of Figure B is 189 mm². If the figures are similar and the perimeter of Figure B is 51 mm, find the perimeter of Figure A.

$$\frac{84}{189} = \frac{4}{9}$$

$$\frac{2}{3} = \frac{x}{51}$$

$$3x = 102$$

$$x = 34 \text{ mm}$$

Name:

Date:

Topic:

Class:

## Main Ideas/Questions

## Notes/Examples

**SIMILAR SOLIDS**

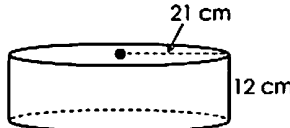
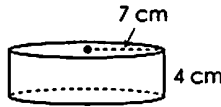
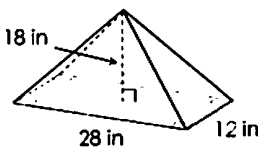
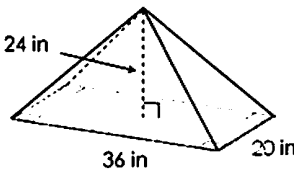
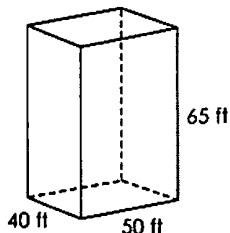
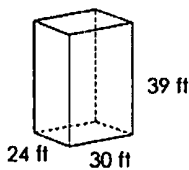
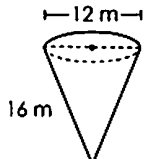
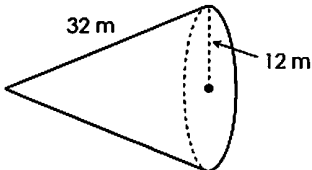
- Similar solids have the same shape, but a different size.
- The corresponding linear measurements of similar solids are proportional.
- The ratio of linear measurements is called the scale factor.

## Types of Linear Measurements

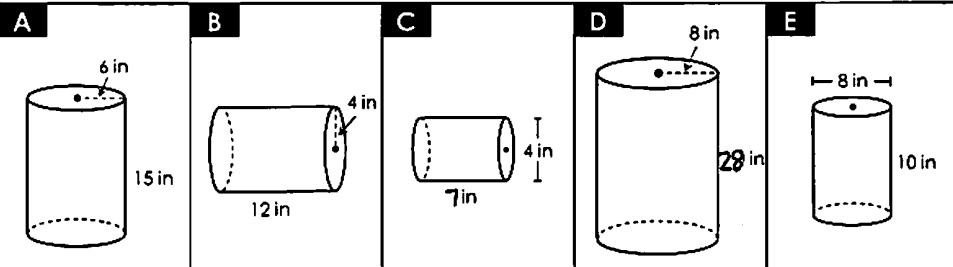
Length, width, height, radius, slant height, diameter, perimeter, circumference

**Examples**

Determine if the solids are similar. If yes, give the scale factor of Solid A to Solid B in simplest form.

Solid A	Solid B	Similar?
1. 		$\frac{21}{7} = 3$ $\frac{12}{4} = 3$ yes!
2. 		$\frac{28}{36} = \frac{7}{9}$ $\frac{18}{24} = \frac{3}{4}$ $\frac{12}{20} = \frac{3}{5}$ no!
3. 		$\frac{40}{24} = \frac{5}{3}$ $\frac{50}{30} = \frac{5}{3}$ $\frac{65}{39} = \frac{5}{3}$ yes!
4. 		$\frac{16}{32} = \frac{1}{2}$ $\frac{6}{12} = \frac{1}{2}$ yes!

Use the diagrams below to answer questions 5 and 6.



5. Which cylinder is similar to Cylinder A? Give the scale factor.

E!  $\frac{6}{4} = \frac{3}{2}$   $\frac{15}{10} = \frac{3}{2}$

6. Which cylinder is similar to Cylinder C? Give the scale factor.

D!  $\frac{2}{8} = \frac{1}{4}$   $\frac{4}{28} = \frac{1}{7}$

## Finding Measures

Assume each pair of solids are similar. Find the missing measure.

7.

$$\frac{9}{15} = \frac{21}{x}$$

$$9x = 315$$

$$x = 35 \text{ cm}$$

8.

$$\frac{20}{16} = \frac{x}{18}$$

$$16x = 360$$

$$x = 22.5 \text{ km}$$

9.

$$\frac{25}{80} = \frac{18}{x}$$

$$25x = 1440$$

$$x = 57.6 \text{ ft}$$

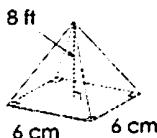
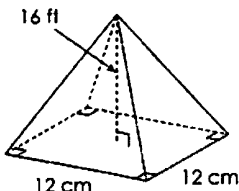
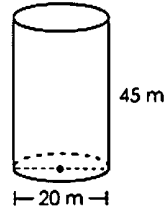
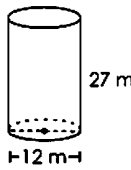
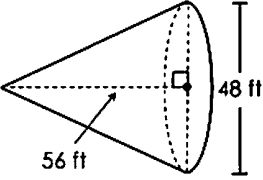
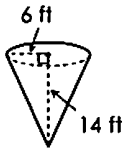
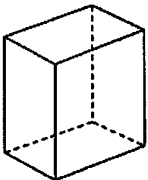
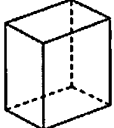
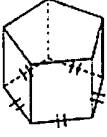
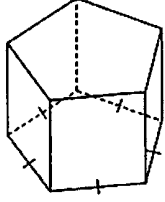
10.

$$\frac{18}{10} = \frac{x}{24}$$

$$10x = 432$$

$$x = 43.2 \text{ yd}$$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
<b>VOLUME &amp; SURFACE AREA</b> of Similar Solids	<p>If two solids are similar with a scale factor of <u><math>a:b</math></u>, then their volume and surface area ratios are as follows:</p> <p>Surface Area: <u><math>a^2:b^2</math></u>; Volume: <u><math>a^3:b^3</math></u></p>
<b>IDENTIFYING RATIOS</b>	<p>Identify the scale factor, surface area ratio, and volume ratio for each pair of similar solids.</p> <div> <p>1.</p> <div style="display: flex; align-items: center;"> <div style="text-align: center;">  <p>8 ft 6 cm 6 cm</p> </div> <div style="text-align: center; margin-left: 20px;">  <p>16 ft 12 cm 12 cm</p> </div> <div style="margin-left: 20px;"> <p>Scale Factor: <u>1:2</u></p> <p>Surface Area Ratio: <u>1:4</u></p> <p>Volume Ratio: <u>1:8</u></p> </div> </div> </div> <div> <p>2.</p> <div style="display: flex; align-items: center;"> <div style="text-align: center;">  <p>45 m 20 m</p> </div> <div style="text-align: center; margin-left: 20px;">  <p>27 m 12 m</p> </div> <div style="margin-left: 20px;"> <p>Scale Factor: <u>5:3</u></p> <p>Surface Area Ratio: <u>25:9</u></p> <p>Volume Ratio: <u>125:27</u></p> </div> </div> </div> <div> <p>3.</p> <div style="display: flex; align-items: center;"> <div style="text-align: center;">  <p>48 ft 56 ft</p> </div> <div style="text-align: center; margin-left: 20px;">  <p>6 ft 14 ft</p> </div> <div style="margin-left: 20px;"> <p>Scale Factor: <u>4:1</u></p> <p>Surface Area Ratio: <u>16:1</u></p> <p>Volume Ratio: <u>64:1</u></p> </div> </div> </div> <div> <p>4.</p> <div style="display: flex; align-items: center;"> <div style="text-align: center;">  <p>SA = 189 mm<sup>2</sup></p> </div> <div style="text-align: center; margin-left: 20px;">  <p>SA = 84 mm<sup>2</sup></p> </div> <div style="margin-left: 20px;"> <p>Scale Factor: <u>3:2</u></p> <p>Surface Area Ratio: <u>9:4</u></p> <p>Volume Ratio: <u>27:8</u></p> </div> </div> </div> <div> <p>5.</p> <div style="display: flex; align-items: center;"> <div style="text-align: center;">  <p>V = 128 in<sup>3</sup></p> </div> <div style="text-align: center; margin-left: 20px;">  <p>V = 686 in<sup>3</sup></p> </div> <div style="margin-left: 20px;"> <p>Scale Factor: <u>4:7</u></p> <p>Surface Area Ratio: <u>16:49</u></p> <p>Volume Ratio: <u>64:343</u></p> </div> </div> </div>



## FINDING SURFACE AREA

\*Use  $a^2:b^2$  to set up a proportion!\*

6. If Cylinder A is similar to Cylinder B with a scale factor of 2:5 and the surface area of Cylinder B is 375 m<sup>2</sup>, find the surface area of Cylinder A.

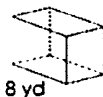
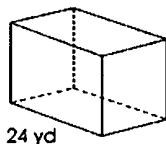
$$\frac{2}{5} \rightarrow \frac{4}{25}$$

$$\frac{4}{25} = \frac{x}{375}$$

$$25x = 1500$$

$$x = 60 \text{ m}^2$$

7. If solids below are similar and the surface area of the larger solid is 1,125 yd<sup>2</sup>, find the surface area of the smaller solid.



$$\frac{24}{8} = \frac{3}{1}$$

$$\frac{9}{1} = \frac{1125}{x}$$

$$9x = 1125$$

$$x = 125 \text{ yd}^2$$

8. The surface area of a prism is 700 cm<sup>2</sup>. If its dimensions are doubled, find the surface area of the new prism.

Scale factor = 1:2

$$a^2:b^2 = 1:4$$

$$\frac{1}{4} = \frac{700}{x}$$

$$x = 2800 \text{ cm}^2$$

## FINDING VOLUME

\*Use  $a^3:b^3$  to set up a proportion!\*

9. If Solid A is similar to Solid B with a scale factor of 4:3 and the volume of Solid A is 704 km<sup>3</sup>, find the volume of Solid B.

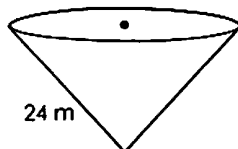
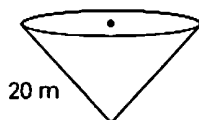
$$\frac{4}{3} \rightarrow \frac{64}{27}$$

$$\frac{64}{27} = \frac{704}{x}$$

$$64x = 19008$$

$$x = 297 \text{ km}^3$$

10. If cones below are similar and the volume of the smaller cone is 625 m<sup>3</sup>, find the volume of the larger cone.



$$\frac{20}{24} = \frac{5}{6} \rightarrow \frac{125}{216}$$

$$\frac{125}{216} = \frac{625}{x}$$

$$125x = 135000$$

$$x = 1080 \text{ m}^3$$

11. The volume of Pyramid A is 3,600 ft<sup>3</sup>. If its dimensions are altered to one-third of their original size, find the volume of the new pyramid.

Scale factor = 3:1

$$a^3:b^3 = 27:1$$

$$\frac{27}{1} = \frac{3600}{x}$$

$$27x = 3600$$

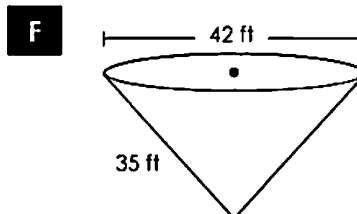
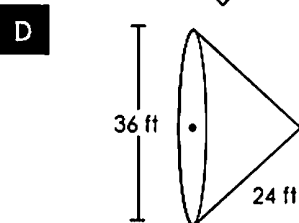
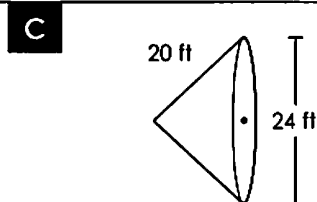
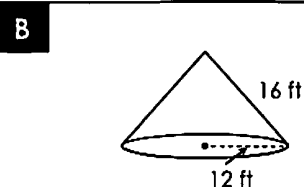
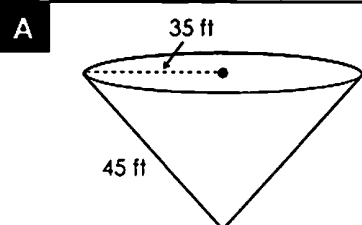
$$x = 133.3 \text{ ft}^3$$

Name: \_\_\_\_\_ Unit 8: Measurement (Area and Volume)

Date: \_\_\_\_\_ Per: \_\_\_\_\_ Homework 14: Similar Solids

**\*\* This is a 2-page document! \*\***

Use the diagrams below to answer questions 1-3.



1. Cone A is similar to Cone E with a scale factor of 5:1.

2. Cone B is similar to Cone D with a scale factor of 2:3.

3. Cone C is similar to Cone F with a scale factor of 4:7.

Assume each pair of solids are similar. Find the missing measure.

4.

$$\frac{28}{21} = \frac{48}{x}$$

$$28x = 1008$$

$$x = 36 \text{ in}$$

5.

$$\frac{6}{10} = \frac{x}{25}$$

$$10x = 150$$

$$x = 15 \text{ cm}$$

6.

$$\frac{39}{13} = \frac{21}{x}$$

$$39x = 273$$

$$x = 7 \text{ yd}$$

7.

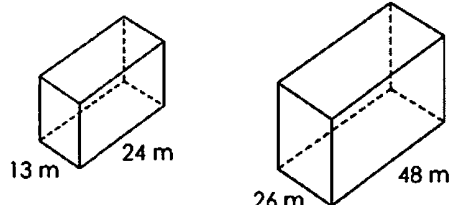
$$\frac{15}{24} = \frac{32}{x}$$

$$15x = 768$$

$$x = 51.2 \text{ ft}$$

**Identify the scale factor, surface area ratio, and volume ratio for each pair of similar solids.**

8.



Scale Factor

1:2

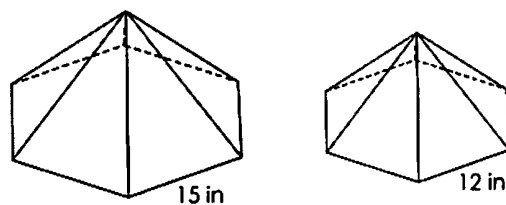
Surface Area Ratio

1:4

Volume Ratio

1:8

9.



Scale Factor

5:4

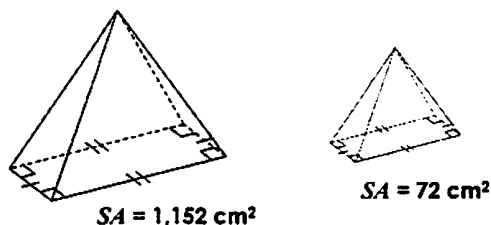
Surface Area Ratio

25:16

Volume Ratio

125:64

10.



Scale Factor

4:1

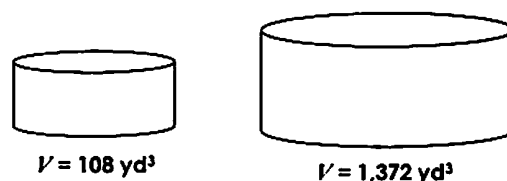
Surface Area Ratio

16:1

Volume Ratio

64:1

11.



Scale Factor

3:7

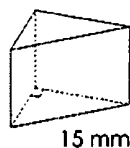
Surface Area Ratio

9:49

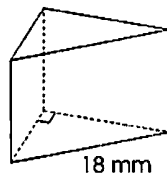
Volume Ratio

27:343

12. If solids below are similar and the surface area of the smaller solid is 225 mm², find the surface area of the larger solid.



$$\frac{15}{18} = \frac{5}{6}$$



$$\frac{25}{36} = \frac{225}{x}$$

$$25x = 8100$$

$$x = 324 \text{ mm}^2$$

13. The surface area of a cone is 72 cm². If the dimensions are tripled, what will be the new surface area of the cone?

$$SF = 1:3$$

$$Area = 1:9$$

$$\frac{1}{9} = \frac{72}{x}$$

$$x = 648 \text{ cm}^2$$

14. If Cylinder A is similar to Cylinder B with a scale factor of 9:4 and the volume of Cylinder B is 320 yd³, find the volume of Cylinder A.

$$\frac{9}{4} \rightarrow \frac{729}{64}$$

$$\frac{729}{64} = \frac{x}{320}$$

$$64x = 233280$$

$$x = 3645 \text{ yd}^3$$

15. The volume of a prism is 744 ft³. If the dimensions are cut in half, what will be the new volume of the prism?

$$SF = 2:1$$

$$Vol = 8:1$$

$$\frac{8}{1} = \frac{744}{x}$$

$$8x = 744$$

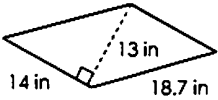
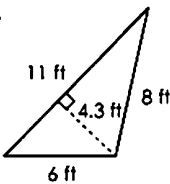
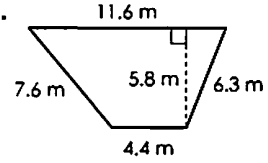
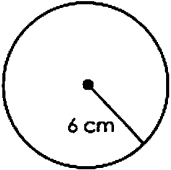
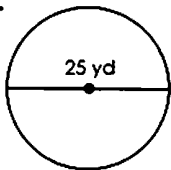
$$x = 93 \text{ ft}^3$$

# Unit 8 Test Study Guide (Measurement: Area & Volume)

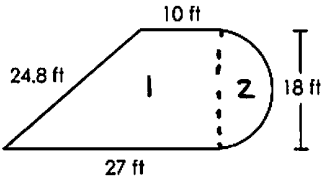
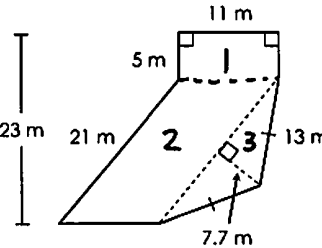
Name: \_\_\_\_\_

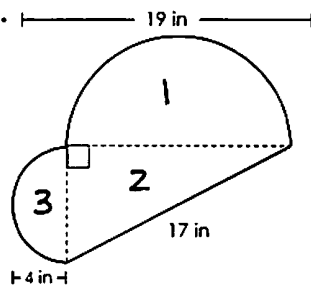
Date: \_\_\_\_\_ Per: \_\_\_\_\_

## Topic 1: Area and Perimeter of Plane Figures

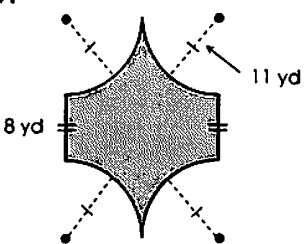
Find the perimeter and area of each figure.					
1.		2.		3.	
$P = 2(14) + 2(18.7)$ $A = 14(13)$		$P = 11 + 6 + 8$ $A = \frac{1}{2}(11)(4.3)$		$P = 11.6 + 7.6 + 6.3 + 4.4$ $A = \frac{1}{2}(5.8)(11.6 + 4.4)$	
Perimeter	Area	Perimeter	Area	Perimeter	Area
65.4 in	182 in <sup>2</sup>	25 ft	23.65 ft <sup>2</sup>	29.9 m	46.4 m <sup>2</sup>
Find the circumference and area of each circle. Round to the nearest tenth.					
4.		$C = 2\pi \cdot 6$ $A = \pi \cdot 6^2$	5.		$C = 25\pi$ $A = \pi (12.5)^2$
Circumference	Area	Circumference	Area	Circumference	Area
37.7 cm	113.1 cm <sup>2</sup>	78.5 yd	490.9 yd <sup>2</sup>		

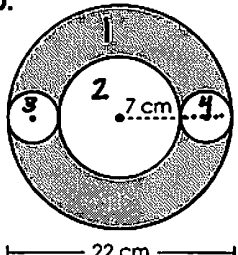
## Topic 2: Area and Perimeter of Composite Figures

Find the perimeter and area of each composite figure. Round to the nearest tenth if necessary.		
Figure	Perimeter	Area
6.		
	Semicircle : $C = \frac{1}{2}(\pi \cdot 18) = 28.3$ $28.3 + 10 + 24.8 + 27$ $= 90.1 \text{ ft}$	$A_1 = \frac{1}{2}(18)(10 + 27)$ $= 333$ $A_2 = \frac{1}{2}\pi(9)^2$ $= 127.2$ $460.2 \text{ ft}^2$
7.		
	$2(11) + 2(5) + 2(13) + 21$ $= 79 \text{ m}$	$A_1 = 5(11) = 55$ $A_2 = 11(18) = 198$ $A_3 = \frac{1}{2}(21)(7.7) = 80.85$ $333.85 \text{ m}^2$

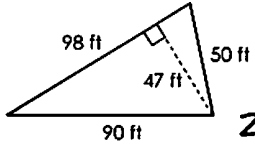
<p>8. </p>	$\text{Semi}_1 = \frac{1}{2}(\pi \cdot 15) = 23.6$ $\text{Semi}_2 = \frac{1}{2}(\pi \cdot 8) = 12.6$	$A_1 = \frac{1}{2}\pi(7.5)^2 = 88.4$ $A_2 = \frac{1}{2}(15)(8) = 60$ $A_3 = \frac{1}{2}\pi(4)^2 = 25.1$
	<b>53.2 in</b>	<b>173.5 in<sup>2</sup></b>

Find the area of the shaded region. Round to the nearest tenth if necessary.

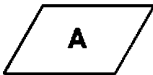

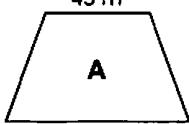
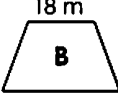
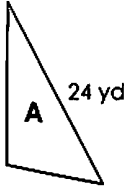
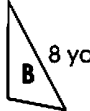
<p>9. </p>	$A_{\text{rectangle}} = (22)(30) = 660$ $A_{\text{circle}} = \pi(11)^2 = 380.1$ $660 - 380.1 = \boxed{279.9 \text{ yd}^2}$
---	--

<p>10. </p>	$A_1 = \pi(11)^2 = 380.1$ $A_2 = \pi(7)^2 = 153.9$ $A_3 = \pi(2)^2 = 12.6$ $380.1 - (153.9 + 2(12.6)) = \boxed{201 \text{ cm}^2}$
---	---

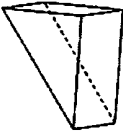
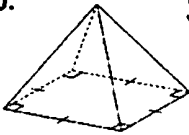
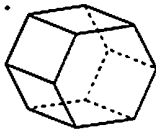
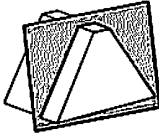


### Topic 3: Area and Perimeter Applications

<p>11. A trapezoid with a height of 14 meters has an area of 217 m<sup>2</sup>. If the length of one base is 12 meters, find the length of the other base.</p> $217 = \frac{1}{2}(14)(b + 12)$ $217 = 7(b + 12)$ $31 = b + 12$ $\boxed{b = 19 \text{ m}}$	<p>12. Josh has a rectangular garden with an area of 324 square feet that he would like to enclose with a fence. If the garden has a length of 24 feet, how much fencing would he need?</p> $324 = b \cdot 24$ $13.5 = b$ $P = 2(24) + 2(13.5)$ $= \boxed{75 \text{ ft}}$
<p>13. Mr. Nelson is buying property in the shape of a triangle to build a new house. If the property costs \$42.50 per square foot, how much will he pay?</p>  $A = \frac{1}{2}(98)(47)$ $= 2303 \text{ ft}^2$ $2303(42.50)$ $= \boxed{\$97,877.50}$	<p>14. Find the circumference of a circle with an area of 615.75 square inches.</p> $615.75 = \pi r^2$ $196 = r^2$ $14 = r$ $C = 2\pi \cdot 14$ $= \boxed{88 \text{ in}}$

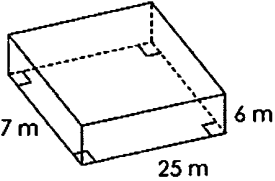
### Topic 4: Area and Perimeter of Similar Figures

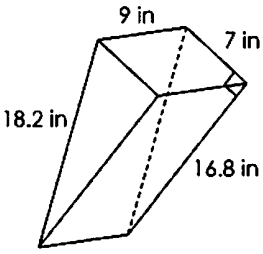
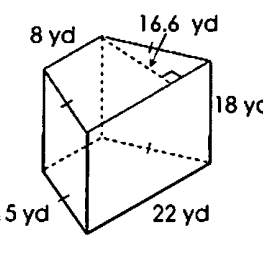
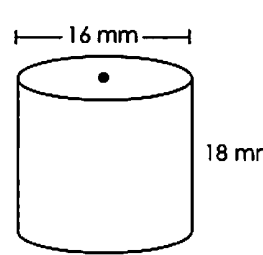
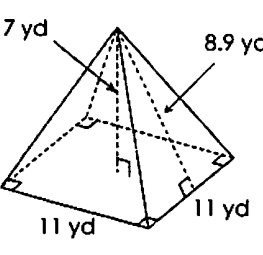
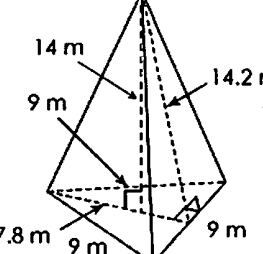
Assume each pair of figures below are similar.		
<p>15. Give the scale factor, perimeter ratio, and area ratio of Figure A to Figure B.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>A 16 mm</p> </div> <div style="text-align: center;">  <p>B 28 mm</p> </div> </div>		
Scale Factor <b>4:7</b>	Perimeter Ratio <b>16:49</b>	Area Ratio <b>64:343</b>
<p>17. Find the area of figure Figure A.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>A 45 m</p> </div> <div style="text-align: center;">  <p>B 18 m A = 336 m<sup>2</sup></p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div> <math>\frac{45}{18} = \frac{5}{2}</math>   <math>\frac{25}{4} = \frac{x}{336}</math> </div> <div> <math>4x = 8400</math>  <math>x = 2100 \text{ m}^2</math> </div> </div>		
<p>16. Find the perimeter of Figure B.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>A 24 yd P = 57 yd</p> </div> <div style="text-align: center;">  <p>B 8 yd</p> </div> </div> <div style="margin-left: 20px; margin-top: 10px;"> <math>\frac{24}{8} = \frac{57}{x}</math>  <math>24x = 456</math>  <math>x = 19 \text{ yd}</math> </div>		
<p>18. The area of Rectangle A is 108 km<sup>2</sup> and the area of Rectangle B is 192 km<sup>2</sup>. If the rectangles are similar and the length of Rectangle A is 15 km, find the length of Rectangle B.</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div> <math>\frac{108}{192} = \frac{9}{16} \left( \frac{a^2}{b^2} \right) \rightarrow \frac{3}{4} = \frac{15}{x}</math>  <math>3x = 60</math>  <math>x = 20 \text{ km}</math> </div> </div>		

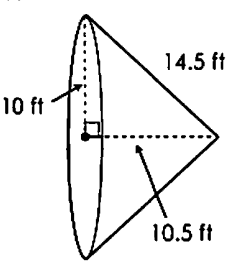
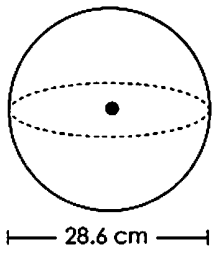
### Topic 5: Classifying and Slicing 3D Figures

Classify the solid.		
<p>19.  Triangular Prism</p>	<p>20.  Square Pyramid</p>	<p>21.  Hexagonal Prism</p>
Draw and describe the cross section that results from each slice.		
<p>22.  trapezoid</p>	<p>23.  triangle</p>	<p>24.  Circle</p>

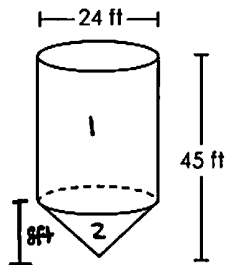
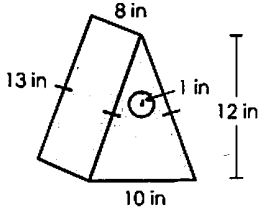
### Topic 6: Volume and Surface Area

Find the volume and surface area of each solid. Round to the nearest tenth if necessary.		
Figure	Volume	Surface Area
<p>25. </p>	$27(25)(6)$ $= 4050 \text{ m}^3$	$2(27)(25) + 2(27)(6)$ $+ 2(25)(6)$ $= 1974 \text{ m}^2$

<p>26.</p> 	$B = \frac{1}{2}(7)(16.8) = 58.8$ $V = 58.8(9)$ $= \boxed{529.2 \text{ in}^3}$	$SA = 9(42) + 2(58.8)$ $= \boxed{495.6 \text{ in}^2}$
<p>27.</p> 	$B = \frac{1}{2}(16.6)(8+22)$ $= 249$ $V = 249(18)$ $= \boxed{4482 \text{ yd}^3}$	$SA = 18(60) + 2(249)$ $= \boxed{1578 \text{ yd}^2}$
<p>28.</p> 	$V = \pi(8)^2(18)$ $= \boxed{3619.1 \text{ mm}^3}$	$SA = 2\pi(8)^2 + 2\pi(8)(18)$ $= 128\pi + 288\pi$ $= \boxed{1306.9 \text{ mm}^2}$
<p>29.</p> 	$B = 11^2 = 121$ $V = \frac{1}{3}(121)(7)$ $= \boxed{282.3 \text{ yd}^3}$	$SA = \frac{1}{2}(8.9)(44) + 121$ $= \boxed{316.8 \text{ yd}^2}$
<p>30.</p> 	$B = \frac{1}{2}(9)(7.8)$ $= 35.1$ $V = \frac{1}{3}(35.1)(14)$ $= \boxed{163.8 \text{ m}^3}$	$SA = \frac{1}{2}(14.2)(27) + 35.1$ $= \boxed{226.8 \text{ m}^2}$

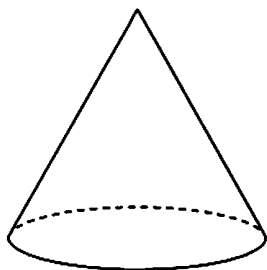
<p>31.</p> 	$V = \frac{1}{3} \pi (10)^2 (10.5)$ $= \boxed{1099.6 \text{ ft}^3}$	$SA = \pi (10)^2 + \pi (10)(14.5)$ $= \boxed{769.7 \text{ ft}^2}$
<p>32.</p> 	$V = \frac{4}{3} \pi (14.3)^3$ $= \boxed{856.6 \text{ cm}^3}$	$SA = 4\pi (14.3)^2$ $= \boxed{2569.7 \text{ cm}^2}$

### Topic 7: Volume and Surface Area Applications

<p>33. A sugar silo is comprised of a cylinder and a cone. How much sugar can the silo hold?</p>  $V_1 = \pi (12)^2 (37)$ $= 16738.4$ $V_2 = \frac{1}{3} \pi (12)^2 (8)$ $= 1206.4$ $\boxed{17,944.8 \text{ ft}^3}$	<p>34. Erin is making a wooden birdhouse with the dimensions shown below. If she plans to paint the house, including its base, what is the total area that will be painted?</p>  $SA = 8(36) + 2(60)$ $= 408$ $\text{Circle} = \pi (1)^2 = 3.1$ $B = \frac{1}{2} (10)(12) = 60$ $\boxed{404.9 \text{ in}^2}$
<p>35. Find the volume of a sphere with a surface area of 2,123.72 square meters.</p> $2123.72 = 4\pi r^2$ $169 = r^2$ $13 = r$ $V = \frac{4}{3} \pi (13)^3$ $= \boxed{9202.8 \text{ m}^3}$	<p>36. A rectangular fish tank at the aquarium has a base that measures 24 feet by 12 feet and a height of 16 feet. The tank is being drained for cleaning at a rate of 480 cubic feet of water per hour. If the tank was originally <math>\frac{3}{4}</math> full of water, how long will it take to fully drain?</p> $V = \frac{3}{4} (24)(12)(16)$ $= 3456 \text{ ft}^3$ $\frac{3456}{480} = \boxed{7.2 \text{ hr}}$



Use the diagram below for questions 37-38.



$$V = 600 \text{ cm}^3$$

37. Describe the changes to the volume of the cone if the height is tripled, then find the new volume.

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

↓  
3

$$V = 3(600) = \boxed{1800 \text{ cm}^3}$$

Volume triples

38. Describe the changes to the volume of the cone if the radius is multiplied by  $\frac{1}{3}$ , then find the new volume.

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

↓  
 $(\frac{1}{3})^2 = \frac{1}{9}$

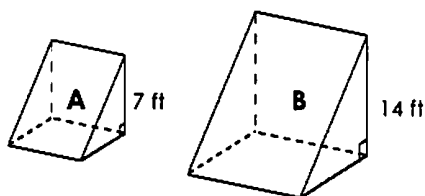
$$V = \frac{1}{9}(600) = \boxed{66.7 \text{ cm}^3}$$

Vol is  $\frac{1}{9}$ th the size.

### Topic 8: Volume and Surface Area of Similar Solids

Give the scale factor, surface area ratio, and volume ratio of Solid A to Solid B.

39.

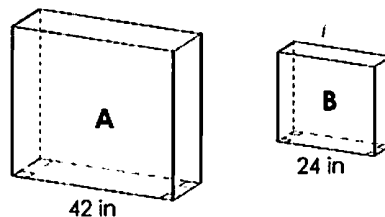


Scale Factor  
1:2

Surface Area Ratio  
1:4

Volume Ratio  
1:8

40.

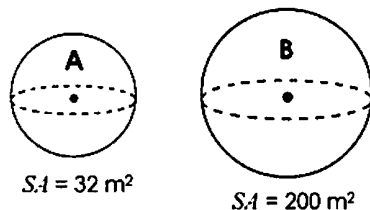


Scale Factor  
7:4

Surface Area Ratio  
49:16

Volume Ratio  
343:64

41.

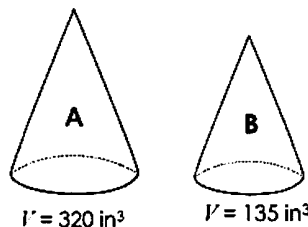


Scale Factor  
2:5

Surface Area Ratio  
4:25

Volume Ratio  
8:125

42.



Scale Factor  
4:3

Surface Area Ratio  
16:9

Volume Ratio  
64:27

43. The scale factor of Cylinder A to Cylinder B is 5:4. If the surface area of Cylinder A is 600 yd², find the surface area of Cylinder B.

$$\frac{5}{4} \rightarrow \frac{25}{16}$$

$$\frac{25}{16} = \frac{600}{x}$$

$$25x = 9600$$

$$x = \boxed{384 \text{ yd}^2}$$

44. The volume of a pyramid is 275 ft³. If its dimensions are multiplied by four, what will be its new volume?

$$SF = 1:4$$

$$Vol = 1:64$$

$$\frac{1}{64} = \frac{275}{x}$$

$$x = \boxed{17,600 \text{ ft}^3}$$

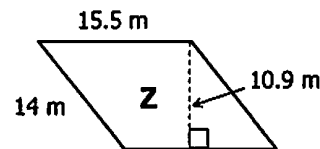
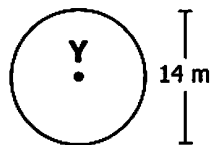
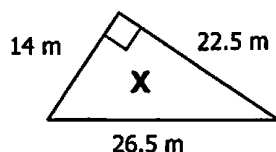
Name: \_\_\_\_\_

Date: \_\_\_\_\_ Per: \_\_\_\_\_

## Unit 8 Test

### Measurement (Area & Volume)

Use the figures to the right to answer questions 1 and 2.



1. Which correctly lists the area of the figures in order from least to greatest?

$$A_X = \frac{1}{2}(14)(22.5) = 157.5$$

$$A_Y = \pi(7)^2 = 153.9$$

$$A_Z = 15.5(10.9) = 168.95$$

- A. X, Z, Y  
B. Y, Z, X  
C. Y, X, Z  
D. Z, X, Y

C

2. Which correctly lists the perimeter of the figures in order from greatest to least?

$$P_X = 63$$

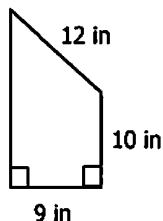
$$C_Y = 44$$

$$P_Z = 59$$

- A. Y, Z, X  
B. X, Z, Y  
C. Z, X, Y  
D. Y, X, Z

B

3. If the area of the trapezoid below is  $121.5 \text{ in}^2$ , find its perimeter.



$$121.5 = \frac{1}{2}(9)(10+b)$$

$$27 = 10+b$$

$$17 = b$$

- A. 48 in  
B. 49 in  
C. 50 in  
D. 51 in

A

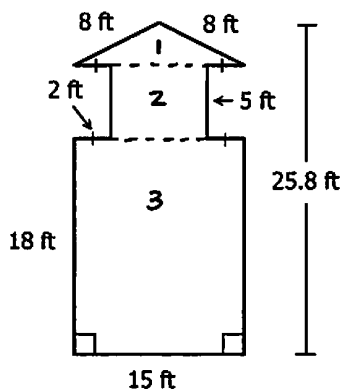
4. If a certain roundabout has diameter of 96 feet, about how far would a car travel if it drove once around?

$$C = \pi \cdot 96$$

- A. 150.8 feet  
B. 301.6 feet  
C. 348.5 feet  
D. 7,238.2 feet

B

Use the diagram below for questions 5 and 6.



5. Find the perimeter.

$$2(8) + 4(2) + 2(5) + 2(18) + 15$$

$$P = 85 \text{ ft}$$

6. Find the area.

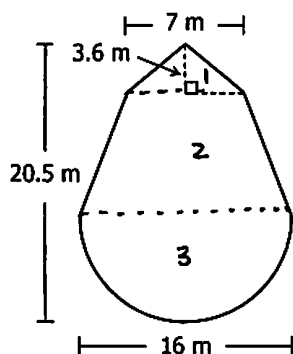
$$A_1 = \frac{1}{2}(15)(2.8) = 21$$

$$A_2 = 5(11) = 55$$

$$A_3 = 18(15) = 270$$

$$A = 346 \text{ ft}^2$$

7. Find the area of the figure below.



$$A_1 = \frac{1}{2}(7)(3.6) \\ = 12.6$$

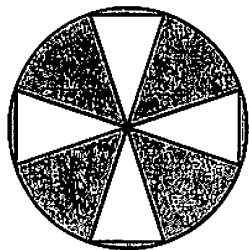
$$A_2 = \frac{1}{2}(8.9)(7+16) \\ = 102.35$$

$$A_3 = \frac{1}{2}\pi(8)^2 \\ = 100.5$$

- (A) 215.45 m<sup>2</sup>  
B. 248.1 m<sup>2</sup>  
C. 293.84 m<sup>2</sup>  
D. 309.6 m<sup>2</sup>

A

8. The four triangles within the circle below are congruent. If each triangle has a base that measures 5 centimeters, legs that measure 9 centimeters each, and a height of 7.4 centimeters, find the area of the shaded region.



$$A_{\text{circle}} = \pi(9)^2 = 254.5$$

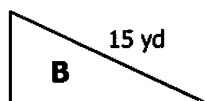
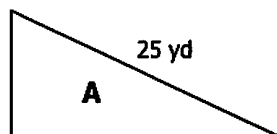
$$A_{\text{triangle}} = \frac{1}{2}(5)(7.4) = 18.5$$

$$254.5 - 4(18.5) = 180.5$$

- A. 129.7 cm<sup>2</sup>  
B. 152.8 cm<sup>2</sup>  
(C) 180.5 cm<sup>2</sup>  
D. 196.1 cm<sup>2</sup>

C

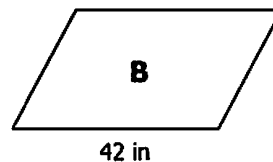
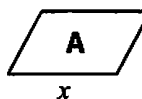
9. If the figures below are similar, give the ratio of the area of Figure A to Figure B.



$$\frac{25}{15} = \frac{5}{3}$$

25 : 9

10. If the perimeter of Figure A is 34 feet and the perimeter of Figure B is 136 feet, find x.



$$\frac{34}{136} = \frac{x}{42}$$

$$136x = 1428 \\ x = 10.5$$

- A. 12 in  
(B) 10.5 in  
C. 16 in  
D. 21 in

B

11. The height of Triangle A is 12 meters and the height of Triangle B is 10 meters. If the triangles are similar and the area of Triangle B is 35 square meters, find the area of Triangle A.

$$\frac{12}{10} = \frac{6}{5} \rightarrow \frac{36}{25} = \frac{x}{35}$$

$$25x = 1260 \\ x = 50.4$$

- A. 42 m<sup>2</sup>  
B. 46.4 m<sup>2</sup>  
C. 48 m<sup>2</sup>  
(D) 50.4 m<sup>2</sup>

D

12. The area of Figure A is 32 in<sup>2</sup> and the area of Figure B is 392 in<sup>2</sup>. If the figures are similar and the perimeter of Figure A is 26 inches, find the perimeter of Figure B.

$$\frac{32}{392} = \frac{4}{49}$$

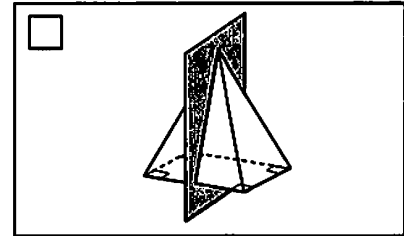
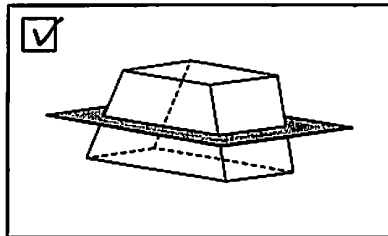
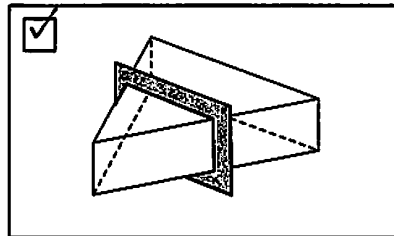
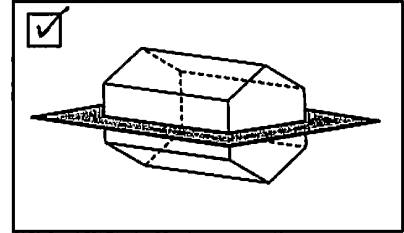
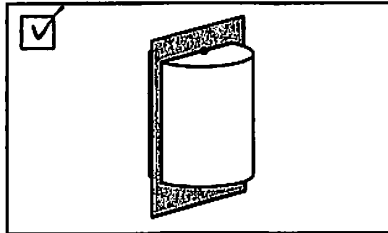
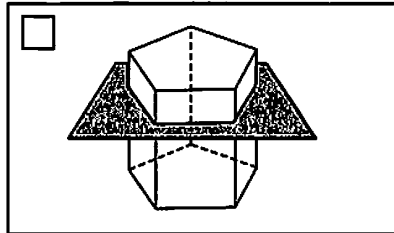
$$\frac{2}{7} = \frac{26}{x}$$

$$2x = 182 \\ x = 91$$

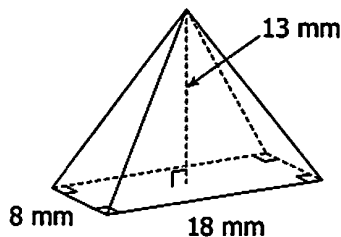
- A. 72 inches  
B. 78 inches  
C. 84 inches  
(D) 91 inches

D

13. Which figures have a rectangular cross section? Check all that apply.



14. Find the **volume** of the figure below.



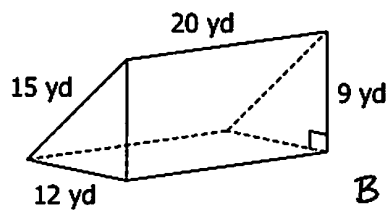
$$B = 8(18) = 144$$

$$V = \frac{1}{3} (144)(13) = 624$$

- A. 615 mm<sup>3</sup>
- ☒ B. 624 mm<sup>3</sup>
- C. 648 mm<sup>3</sup>
- D. 675 mm<sup>3</sup>

B

15. Find the **volume** of the figure below.



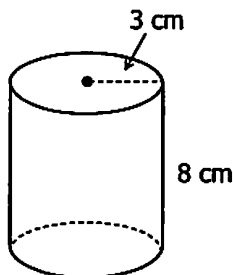
$$B = \frac{1}{2} (12)(9) = 54$$

$$V = 54(20) = 1080$$

- A. 900 yd<sup>3</sup>
- B. 928 yd<sup>3</sup>
- C. 954 yd<sup>3</sup>
- ☒ D. 1,080 yd<sup>3</sup>

D

16. Find the **volume** of the figure below.

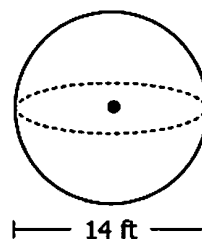


$$V = \pi (3)^2 (8) = 72\pi = 226.2$$

- A. 198.4 cm<sup>3</sup>
- B. 209.5 cm<sup>3</sup>
- ☒ C. 226.2 cm<sup>3</sup>
- D. 248.7 cm<sup>3</sup>

C

17. Find the **volume** of the figure below.

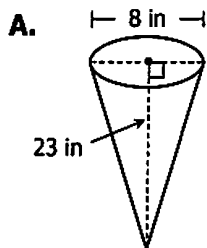


$$V = \frac{4}{3} \pi (7)^3 = 1436.8$$

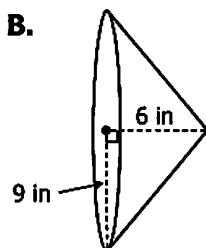
- A. 1,280.5 ft<sup>3</sup>
- B. 1,372.1 ft<sup>3</sup>
- ☒ C. 1,436.8 ft<sup>3</sup>
- D. 1,496.4 ft<sup>3</sup>

C

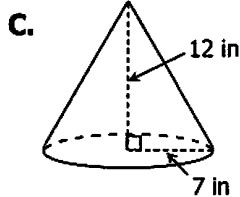
18. Which cone has the **greatest volume**?



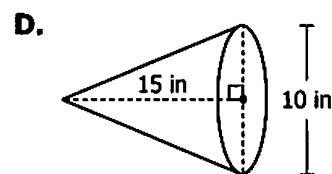
$$V = \frac{1}{3} \pi (4)^2 (23) \\ = 385.4$$



$$V = \frac{1}{3} \pi (9)^2 (6) \\ = 508.9$$



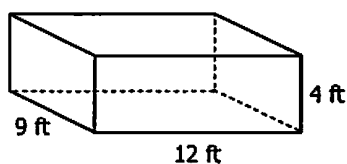
$$V = \frac{1}{3} \pi (7)^2 (12) \\ = 615.8$$



$$V = \frac{1}{3} \pi (5)^2 (15) \\ = 392.7$$

C

19. Find the **surface area** of the figure below.

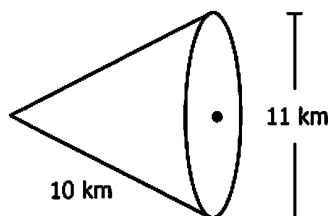


$$SA = 2(9)(12) + 2(9)(4) + \\ 2(12)(4)$$

- A. 326 ft<sup>2</sup>
- B. 358 ft<sup>2</sup>
- ☒ C. 384 ft<sup>2</sup>
- D. 432 ft<sup>2</sup>

C

20. Find the **surface area** of the figure below.

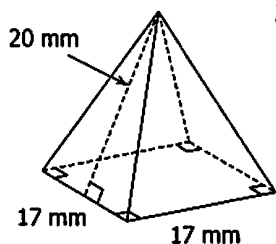


$$SA = \pi (5.5)^2 + \pi (5.5)(10) \\ =$$

- ☒ A. 267.8 km<sup>2</sup>
- B. 289.5 km<sup>2</sup>
- C. 301.4 km<sup>2</sup>
- D. 318.7 km<sup>2</sup>

A

21. Find the **surface area** of the figure below.

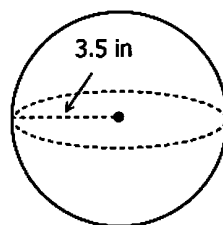


$$SA = \frac{1}{2} (20)(68) + 17^2 \\ = 969$$

- ☒ A. 969 mm<sup>2</sup>
- B. 984 mm<sup>2</sup>
- C. 1,040 mm<sup>2</sup>
- D. 1,105 mm<sup>2</sup>

A

22. Find the **surface area** of the figure below.

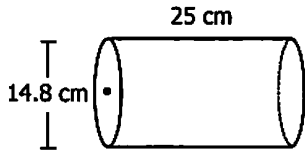


$$SA = 4 \pi (3.5)^2 \\ = 153.9$$

- A. 141.5 in<sup>2</sup>
- ☒ B. 153.9 in<sup>2</sup>
- C. 160.8 in<sup>2</sup>
- D. 173.1 in<sup>2</sup>

B

23. Find the **surface area** of the figure below.

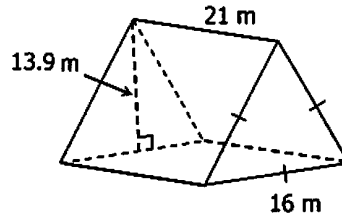


$$SA = 2\pi(7.4)^2 + 2\pi(7.4)(25) \\ = 1506.5$$

- A. 1,382.1 cm<sup>2</sup>
- B. 1,415.9 cm<sup>2</sup>
- C. 1,478.4 cm<sup>2</sup>
- ☒ D. 1,506.5 cm<sup>2</sup>

D

24. Find the **surface area** of the figure below.



$$B = \frac{1}{2}(16)(13.9) \\ = 111.2$$

$$SA = 21(48) + 2(111.2) \\ = 1230.4$$

- A. 1,119.1 m<sup>2</sup>
- ☒ B. 1,230.4 m<sup>2</sup>
- C. 1,294.3 m<sup>2</sup>
- D. 1,328.2 m<sup>2</sup>

B

25. A cylindrical fire extinguisher has a diameter of 9 centimeters and a height of 30 centimeters. What is the maximum amount of carbon dioxide that it can contain?

$$V = \pi(4.5)^2(30) \\ = 1908.5$$

- A. 975.5 cm<sup>3</sup>
- B. 1,270.2 cm<sup>3</sup>
- C. 1,548.3 cm<sup>3</sup>
- ☒ D. 1,908.5 cm<sup>3</sup>

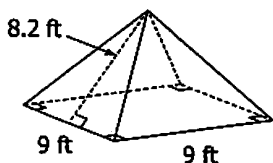
D

26. If a cone has a height of 16 feet and a volume of 603.19 cubic feet, find the length of its diameter.

$$603.19 = \frac{1}{3}\pi r^2(16) \\ 36 = r^2 \\ 6 = r$$

$$d = 12 \text{ ft}$$

27. The roof on a shed is a square base pyramid. If one bundle of shingles covers 40 square feet, find the minimum number of bundles of shingles needed to cover the roof.

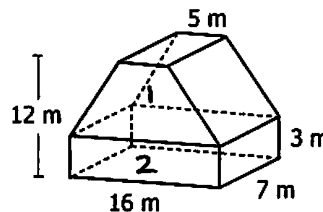


$$LA = \frac{1}{2}(8.2)(36) \\ = 147.6$$

- A. 3 bundles
- ☒ B. 4 bundles
- C. 5 bundles
- D. 6 bundles

B

28. Find the **volume** of the figure below.



$$B_1 = \frac{1}{2}(16)(5) \\ = 40$$

$$V_1 = 40(7) \\ = 280$$

$$V_2 = 16(7)(3) \\ = 336$$

- A. 902.4 m<sup>3</sup>
- B. 948.2 m<sup>3</sup>
- ☒ C. 997.5 m<sup>3</sup>
- D. 1,120.9 m<sup>3</sup>

C

29. How will the volume of a cylinder change if its height is multiplied by one-fourth?

- A. It will be 1/16 of the original volume.
- B. It will be 1/8 of the original volume.
- ☒ C. It will be 1/4 of the original volume.
- D. It will be 1/2 of the original volume.

C

30. The surface area of a sphere is  $275 \text{ cm}^2$ . If its radius is doubled, find the new surface area.

$$SA = 4\pi r^2$$

$$\downarrow$$

$$(2)^2 = 4$$

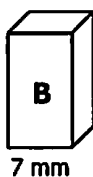
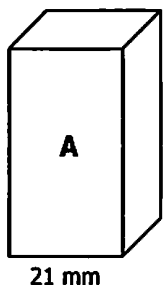
$$275(4) = 1100$$

- A.  $550 \text{ cm}^2$
- ☒ B.  $1,100 \text{ cm}^2$
- C.  $1,650 \text{ cm}^2$
- D.  $1,375 \text{ cm}^2$

B

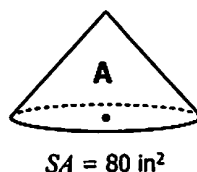
31. If the solids below are similar, give the ratio of the volume of Figure A to the volume of Figure B.

$$\frac{21}{7} = \frac{3}{1}$$

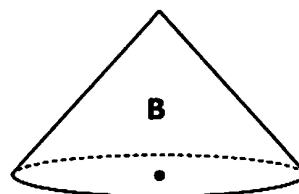


27 : 1

32. If the cones below are similar, what is the ratio of the height of Cone A to the height of Cone B?



$SA = 80 \text{ in}^2$

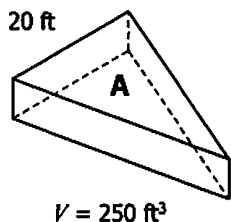


$SA = 405 \text{ in}^2$

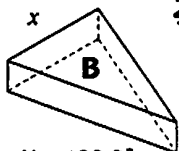
$$\frac{80}{405} = \frac{16}{81} \left( \frac{a^2}{b^2} \right)$$

4 : 9

33. If the solids below are similar, find  $x$ .



$V = 250 \text{ ft}^3$



$V = 128 \text{ ft}^3$

$$\frac{250}{128} = \frac{125}{64} \left( \frac{a^3}{b^3} \right)$$

$$\frac{5}{4} = \frac{20}{x} \quad 5x = 80 \quad x = 16$$

- A. 18 ft
- ☒ B. 16 ft
- C. 15 ft
- D. 12 ft

B

34. Cylinder A is similar to Cylinder B with a scale factor of 1:2. If the surface area of Cylinder B is 148 square meters, find the surface area of Cylinder A.

$$\frac{1}{2} \rightarrow \frac{1}{4} \left( \frac{a^2}{b^2} \right)$$

$$\frac{1}{4} = \frac{x}{148}$$

$$4x = 148$$

$$x = 37$$

- A.  $18.5 \text{ m}^2$
- ☒ B.  $37 \text{ m}^2$
- C.  $74 \text{ m}^2$
- D.  $90 \text{ m}^2$

B

35. The volume of a prism is 2,214 cubic yards. If its dimensions are multiplied by one-third, find the new volume of the prism.

$$SF = 3:1$$

$$Vol = 27:1$$

$$(a^3):(b^3)$$

$$\frac{27}{1} = \frac{2214}{x}$$

$$27x = 2214$$

$$x = 82$$

- ☒ A.  $82 \text{ yd}^3$
- B.  $246 \text{ yd}^3$
- C.  $738 \text{ yd}^3$
- D.  $1,107 \text{ yd}^3$

A

Good Job! 😊

# CREDITS

I use clipart and  
fonts in my products by:



Art with Jenny K



Many thanks to these  
talented artists!