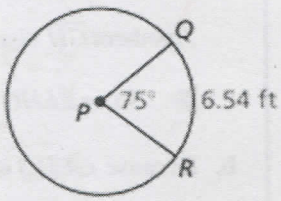
Name Key Date Pd

GEO Ch. 11 Test Review

11.1 Circumference and Arc Length

The arc length of $\overset{\frown}{QR}$ is 6.54 feet. Find the radius of $\odot P$.



$$\frac{\text{Arc length of } \overset{\frown}{QR}}{2\pi r} = \frac{m\overset{\frown}{QR}}{360^\circ}$$ Formula for arc length

$$\frac{6.54}{2\pi r} = \frac{75^\circ}{360^\circ}$$ Substitute.

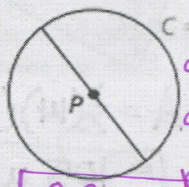
$$6.54(360) = 75(2\pi r)$$ Cross Products Property

$$5.00 \approx r$$ Solve for r.

▶ The radius of $\odot P$ is about 5 feet.

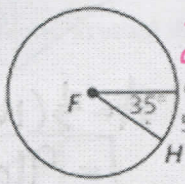
Find the indicated measure.

1. diameter of $\odot P$



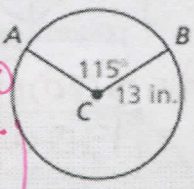
$2\pi r$
$2r = \frac{94.24}{2\pi}$
$r = 14.961$
$d = 29.921$ ft

2. circumference of $\odot F$



$\frac{5.5}{2\pi r} = \frac{35}{360}$
$35x = 1980$
$x = 56.571$ cm

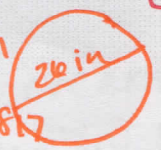
3. arc length of $\overset{\frown}{AB}$



$\frac{x}{2\pi(13)} = \frac{115}{360}$
$360x = 2990\pi$
$x = \frac{299\pi}{36}$
≈ 26.093 in

4. A mountain bike tire has a diameter of 26 inches. To the nearest foot, how far does the tire travel when it makes 32 revolutions?

$D = C \cdot \#\text{rev} \Rightarrow 26\pi(32) \approx 2613.805$ in



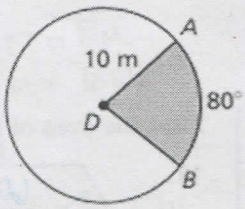
$C = \pi d = 26\pi$

$\frac{2613.805}{12} = 217.817$ ft

≈ 218 ft

11.2 Areas of Circles and Sectors

Find the area of sector ADB.



$$\text{Area of sector } ADB = \frac{m\overset{\frown}{AB}}{360^\circ} \cdot \pi r^2$$ Formula for area of a sector

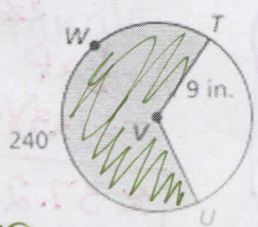
$$= \frac{80^\circ}{360^\circ} \cdot \pi \cdot 10^2$$ Substitute.

$$\approx 69.81$$ Use a calculator.

▶ The area of sector ADB is about 69.81 square meters.

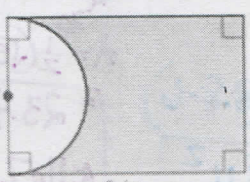
Find the area of the blue shaded region.

5.



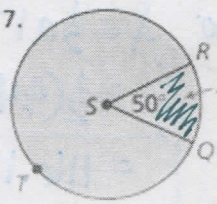
$\frac{240}{360}(\pi 9^2)$
$= 54\pi$ in$^2 \approx 169.646$ in^2

6.



$A = \square - \frac{1}{2}\odot$
$= lw - \frac{1}{2}\pi(r)^2$
$= 6(4) - \frac{1}{2}\pi(2)^2$
$= 24 - 2\pi$ in$^2 \approx 17.717$ in^2

7.

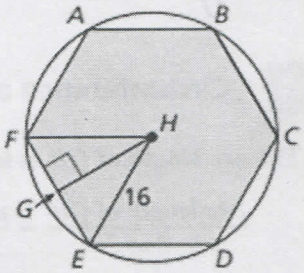


A = 27.93 ft^2

$\frac{27.93}{A} = \frac{50}{360}$
$50A = 10054.8$
$A = 201.096$ ft^2

11.3 Areas of Polygons

A regular hexagon is inscribed in $\odot H$. Find (a) $m\angle EHG$, and (b) the area of the hexagon.



a. $\angle FHE$ is a central angle, so $m\angle FHE = \frac{360°}{6} = 60°$.

Apothem $\overline{GH}$ bisects $\angle FHE$.

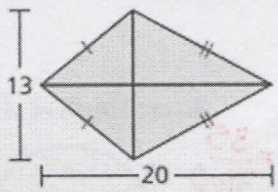
▶ So, $m\angle EHG = 30°$.

b. Because $\triangle EHG$ is a 30°-60°-90° triangle, $GE = \frac{1}{2} \cdot HE = 8$ and $GH = \sqrt{3} \cdot GE = 8\sqrt{3}$. So, $s = 2(GE) = 16$ and $a = GH = 8\sqrt{3}$.

▶ The area is $A = \frac{1}{2}a \cdot ns = \frac{1}{2}(8\sqrt{3})(6)(16) \approx 665.1$ square units.

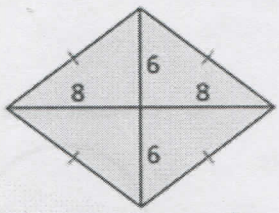
Find the area of the kite or rhombus. $A = \frac{1}{2}d_1 d_2$

8.



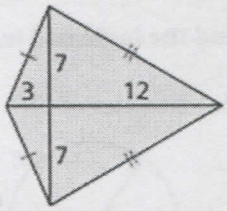
$A = \frac{1}{2}(20)(13)$
$= 130\ u^2$

9.



$A = \frac{1}{2}(16)(12)$
$= 96\ u^2$

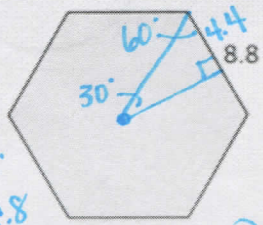
10.



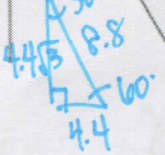
$A = \frac{1}{2}(14)(15)$
$= 105\ u^2$

Find the area of the regular polygon. $A = \frac{1}{2}aP$

11.

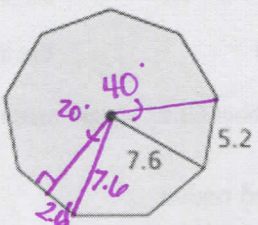


$\frac{360}{6}$
$60°$



$A = \frac{1}{2}aP$
$= \frac{1}{2}(4.4\sqrt{3})(8.8 \cdot 6)$
$= 116.16\sqrt{3}\ u^2$
$\approx 201.195\ u^2$

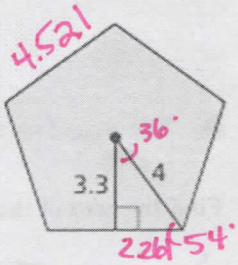
12.



$\frac{360}{9}$
$40°$

$A = \frac{1}{2}(\sqrt{51})(5.2)(9)$
$= 23.4\sqrt{51}\ u^2$
$\approx 167.109\ u^2$

13.



$\frac{360}{5}$
$36°$

$A = \frac{1}{2}aP$
$= \frac{1}{2}(3.3)(4.521)(5)$
$\approx 37.298\ u^2$

14. A platter is in the shape of a regular octagon with an apothem of 6 inches. Find the area of the platter.

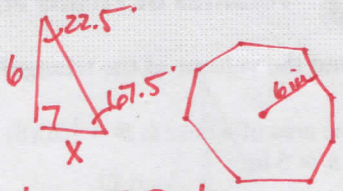
$\frac{360}{8} = 45°$

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

$= \frac{1}{2}(6)\left(\frac{6}{\tan 67.5}\right)(8)(2)$

$= \frac{144.2}{\tan 67.5}\ in^2$

$\approx 119.294\ in^2$

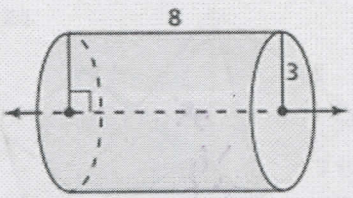


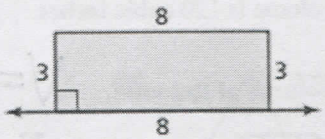
$\tan 67.5 = \frac{6}{x}$

$x = \frac{6}{\tan 67.5}$

11.4 Three-Dimensional Figures

Sketch the solid produced by rotating the figure around the given axis. Then identify and describe the solid.

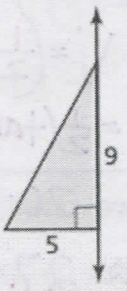




▶ The solid is a cylinder with a height of 8 and a radius of 3.

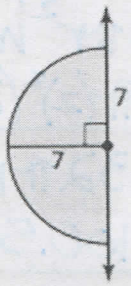
Sketch the solid produced by rotating the figure around the given axis. Then identify and describe the solid.

15.



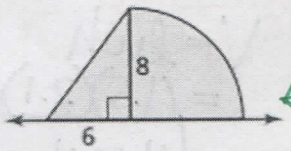
cone
ht: 9u
Radius: 5u

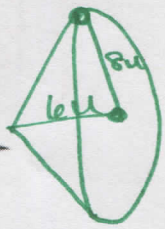
16.



sphere
r: 7u

17.

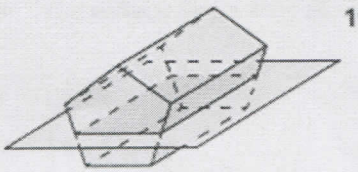




ice cream cone
cone w/ hemisphere
r = 8u
h = 6u

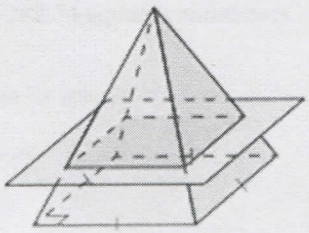
Describe the cross section formed by the intersection of the plane and the solid.

18.



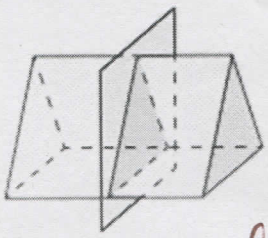
rectangle

19.



square.

20.

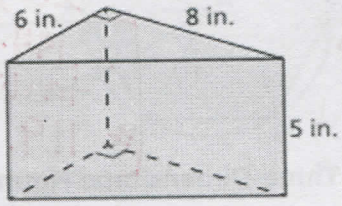


triangle

11.5 Volumes of Prisms and Cylinders

Find the volume of the triangular prism.

The area of a base is $B = \frac{1}{2}(6)(8) = 24$ in.^{2} and the height is $h = 5$ in.



$V = Bh$ Formula for volume of a prism

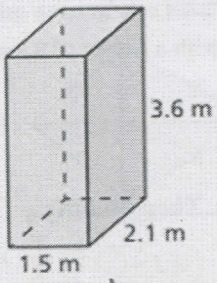
$= 24(5)$ Substitute.

$= 120$ Simplify.

▶ The volume is 120 cubic inches.

Find the volume of the solid. $V = Bh$

21.

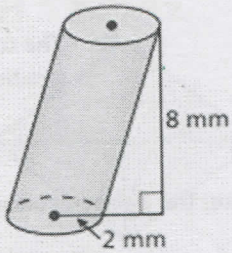


$V = lwh$

$= (1.5)(2.1)(3.6)$

$= 11.34 \text{ m}^3$

22.



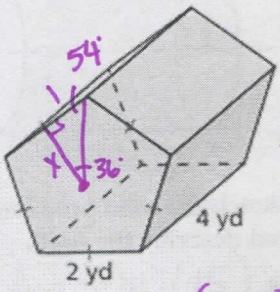
$V = \pi r^2 h$

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

$= 32\pi \text{ mm}^3$

$\approx 100.531 \text{ mm}^3$

23.



$\frac{360}{5} = 72$

$\tan 54 = \frac{x}{1}$

$V = \left(\frac{1}{2}aP\right)h$

$= \frac{1}{2}(\tan 54)(2.5)(4)$

$= 20 \tan 54 \text{ yd}^3$

$\approx 27.528 \text{ yd}^3$

11.6 Volumes of Pyramids

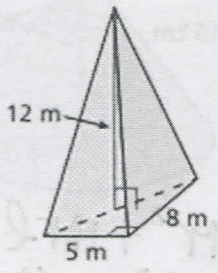
Find the volume of the pyramid.

$V = \frac{1}{3}Bh$ Formula for volume of a pyramid

$= \frac{1}{3}\left(\frac{1}{2} \cdot 5 \cdot 8\right)(12)$ Substitute.

$= 80$ Simplify.

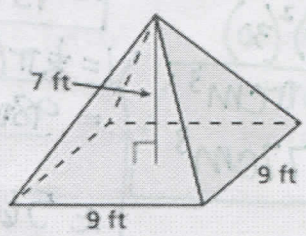
▶ The volume is 80 cubic meters.



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

Find the volume of the pyramid.

24.

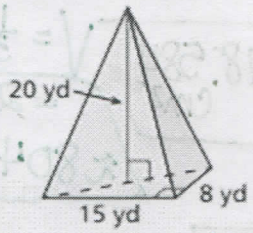


$V = \frac{1}{3}(s^2)(h)$

$= \frac{1}{3}(9)^2(7)$

$= 189 ft^3$

25.

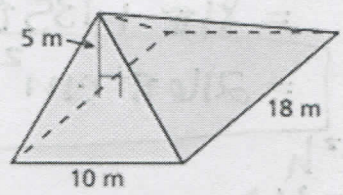


$V = \frac{1}{3}\left(\frac{1}{2}bh\right)(h)$

$= \frac{1}{3}\left(\frac{1}{2}(15)(8)\right)(20)$

$= 400 yds^3$

26.



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

$= \frac{1}{3}(18)(10)(5)$

$= 300 m^3$

11.7 Surface Areas and Volumes of Cones

Find the (a) surface area and (b) volume of the cone.

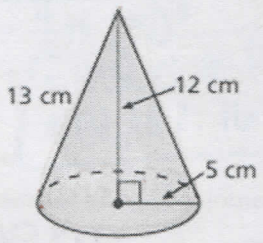
a. $S = \pi r^2 + \pi r\ell$ Formula for surface area of a cone

$= \pi \cdot 5^2 + \pi(5)(13)$ Substitute.

$= 90\pi$ Simplify.

≈ 282.74 Use a calculator.

▶ The surface area is 90π, or about 282.74 square centimeters.



b. $V = \frac{1}{3}\pi r^2 h$ Formula for volume of a cone

$= \frac{1}{3}\pi \cdot 5^2 \cdot 12$ Substitute.

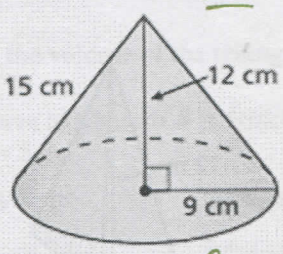
$= 100\pi$ Simplify.

≈ 314.16 Use a calculator.

▶ The volume is 100π, or about 314.16 cubic centimeters.

Find the surface area and the volume of the cone.

29.



$T = \pi r^2 + \pi r\ell$

$= \pi(9)^2 + \pi(9)(15)$

$= 81\pi + 135\pi$

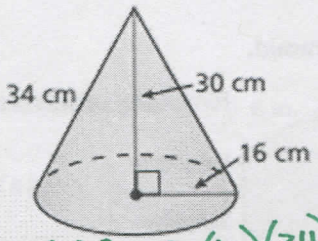
$= 216\pi \text{ cm}^2 \approx 678.584 \text{ cm}^2$

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

$= \frac{1}{3}\pi(9)^2(12)$

$= 324\pi \text{ cm}^3 \approx 1017.876 \text{ cm}^3$

30.



$S = \pi(16)^2 + \pi(16)(34)$

$= 256\pi + 544\pi$

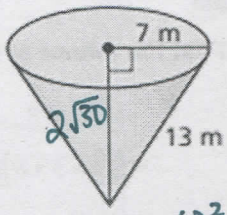
$= 800\pi \approx 2513.274 \text{ cm}^2$

$V = \frac{1}{3}\pi(16)^2(30)$

$= 2560\pi \text{ cm}^3$

$\approx 8042.477 \text{ cm}^3$

31.



$SA = \pi(7)^2 + \pi(7)(13)$

$= 49\pi + 91\pi$

$= 140\pi \text{ m}^2$

$\approx 439.823 \text{ m}^2$

$V = \frac{1}{3}\pi(7)^2(2\sqrt{30})$

$= \frac{98\pi\sqrt{30}}{3} \text{ m}^3$

$\approx 562.102 \text{ m}^3$

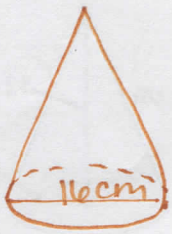
32. A cone with a diameter of 16 centimeters has a volume of 320π cubic centimeters. Find the height of the cone.

$V = 320\pi \text{ cm}^3$

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

$320\pi = \frac{1}{3}\pi(8)^2 h$

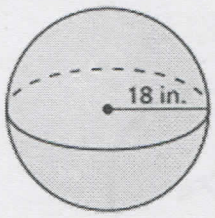
$15 = \pi h$



$h = 15$

11.8 Surface Areas and Volumes of Spheres

Find the (a) surface area and (b) volume of the sphere.



a. $S = 4\pi r^2$ Formula for surface area of a sphere

$= 4\pi(18)^2$ Substitute 18 for r.

$= 1296\pi$ Simplify.

≈ 4071.50 Use a calculator.

▶ The surface area is 1296π, or about 4071.50 square inches.

b. $V = \frac{4}{3}\pi r^3$ Formula for volume of a sphere

$= \frac{4}{3}\pi(18)^3$ Substitute 18 for r.

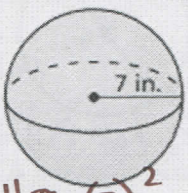
$= 7776\pi$ Simplify.

$\approx 24{,}429.02$ Use a calculator.

▶ The volume is 7776π, or about 24,429.02 cubic inches.

Find the surface area and the volume of the sphere.

33.



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

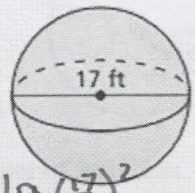
$= 196\pi \text{ in}^2$

$\approx 615.752 \text{ in}^2$

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(7)^3 = \frac{1372\pi}{3} \text{ in}^3$

$\approx 1436.755 \text{ in}^3$

34.



$S = 4\pi\left(\frac{17}{2}\right)^2$

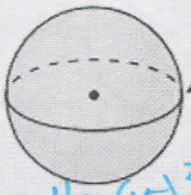
$= 289\pi \text{ ft}^2$

$\approx 907.920 \text{ ft}^2$

$V = \frac{4}{3}\pi\left(\frac{17}{2}\right)^3$

$= \frac{4913\pi}{6} \approx 2572.441 \text{ ft}^3$

35.



$2\pi r$

$r = 15$

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

$= 900\pi \approx 2827.433 \text{ ft}^2$

$V = \frac{4}{3}\pi(15)^3$

$= 4500\pi \text{ ft}^3$

$\approx 14{,}137.167 \text{ ft}^3$

36. The shape of Mercury can be approximated by a sphere with a diameter of 4880 kilometers. Find the surface area and the volume of Mercury.

$r = 2440 \text{ km}$

$T = 4\pi(2440)^2$

$= 23814400\pi \text{ km}^2$

$\approx 74815144.09 \text{ km}^2$

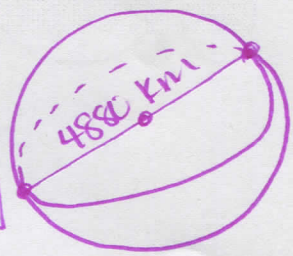
$\approx 74.8 \text{ million km}^2$

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

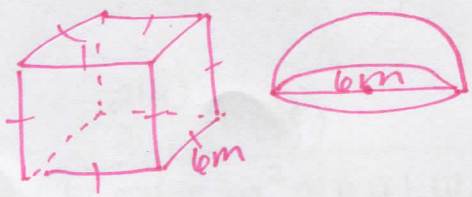
$= \frac{4}{3}\pi(2440)^3$

$\approx 6.085 \times 10^{10} \text{ km}^3$

$\approx 60.8 \text{ billion km}^3$



37. A solid is composed of a cube with a side length of 6 meters and a hemisphere with a diameter of 6 meters. Find the volume of the composite solid.



$V = \square + \frac{1}{2}$ ☺

$= lwh + \frac{1}{2}\left(\frac{4}{3}\pi r^3\right)$

$= 6^3 + \frac{1}{2}\left(\frac{4}{3}\pi(3^3)\right)$

$= 216 + 18\pi \text{ m}^3$

$\approx 272.549 \text{ m}^3$