Name Schlansky
Mr. Schlansky

Date _____
Geometry

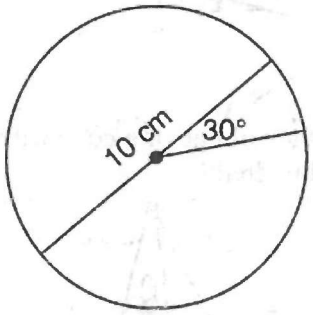
Area and Volume Review Sheet

1. A circle with a diameter of 10 cm and a central angle of 30° is drawn below. type π in
What is the area, to the *nearest tenth of a square centimeter*, of the sector formed by the 30° angle?

$A=\frac{\theta\pi r^2}{360}$ $r=5$ $\theta=30$

$A=\frac{30\pi(5)^2}{360}$

$A=6.5$



2. Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.

$A=\frac{\theta\pi r^2}{360}$ $r=4.5$ $\theta=40$

$A=\frac{40\pi(4.5)^2}{360}$

$A=2.25\pi$

3. Which expression represents the arc length of a sector that has a radius of 4 inches and has a central angle of 45°?

1) $\frac{1}{4}(4)(\pi)$ 3) $\frac{1}{4}(8)(\pi)$

2) $\frac{1}{8}(4)(\pi)$ 4) $\frac{1}{8}(8)(\pi)=3.1415...$

$L=\frac{\theta\pi d}{360}$ $r=4, d=8$ $\theta=45$

$L=\frac{45\pi(8)}{360}=3.1415...$

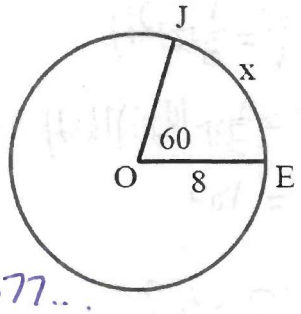
4. Which expression represents the length of $\overset{\frown}{JE}$?

1) $\frac{1}{6}(8)(\pi)$ 3) $\frac{1}{6}(16)(\pi)$ 8.377...

2) $\frac{1}{3}(8)(\pi)$ 4) $\frac{1}{3}(16)(\pi)$

$L=\frac{\theta\pi d}{360}$

$L=\frac{60\pi(16)}{360}=8.377...$



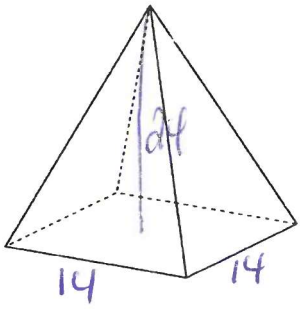
$r=8, d=16$ $\theta=60$

5. A regular pyramid has a square base with an edge length of 14 and an altitude of 24. Find its volume.

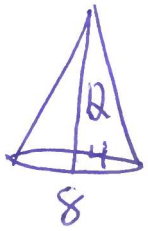
$V = \frac{1}{3}lwh$

$V = \frac{1}{3}(14)(14)(24)$

$V = 1568$



6. Find the volume of a cone with a ~~slant~~ height of 12 in and a diameter of 8 in rounded to the nearest hundredth.



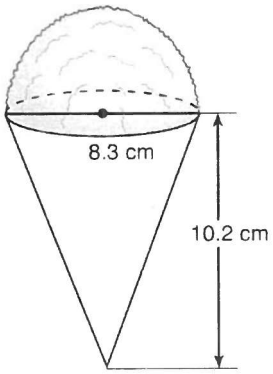
$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi(4)^2(12)$

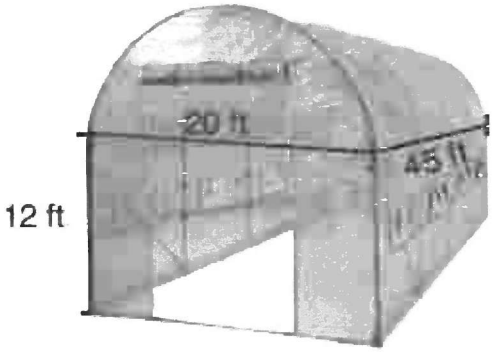
$V = 201.06$

Find the volume of the following objects rounded to the *nearest tenth*:

7.



8.



hemisphere

$V = \frac{1}{2}(\frac{4}{3}\pi r^3)$

$V = \frac{1}{2}(\frac{4}{3}\pi(4.15)^3)$

$V = 149...$

cone

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

$V = \frac{1}{3}\pi(4.15)^2(10.2)$

$V = 183...$

$149... + 183... = 333.7$

half cylinder

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

$V = \frac{1}{2}\pi(10)^2(45)$

$V = 7068...$

rectangular prism

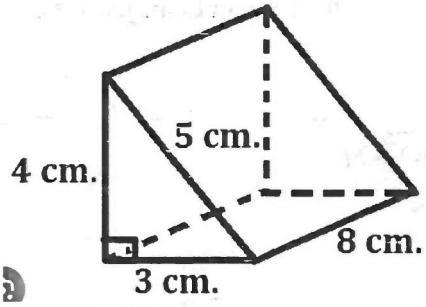
$V = lwh$

$V = (240)(45)$

$V = 10800$

$10800 + 7068... = 17868.5$

9.

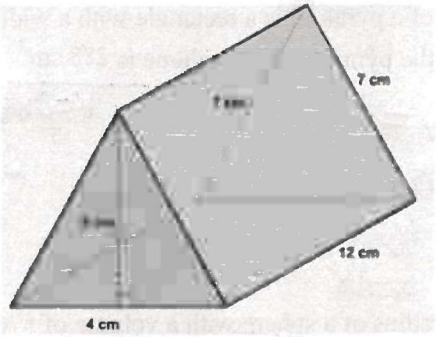


$V = \frac{1}{2}lwh$

$V = \frac{1}{2}(3)(8)(4)$

$V = 48$

10.



$V = \frac{1}{2}lwh$

$V = \frac{1}{2}(12)(4)(6)$

$V = 144$

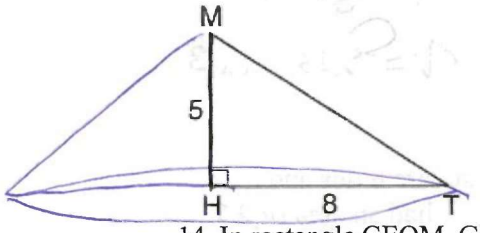
11. A plane intersects a hexagonal prism. The plane is perpendicular to the base of the prism. Which two-dimensional figure is the cross section of the plane intersecting the prism?

1) triangle
2) trapezoid
3) hexagon
4) rectangle

12. The cross section of a regular pyramid contains the altitude of the pyramid. The shape of this cross section is a

1) circle
2) square
3) triangle
4) rectangle

13. In right triangle MTH shown below, $m\angle H = 90°$, $HT = 8$, and $HM = 5$. Determine and state, to the *nearest tenth*, the volume of the three-dimensional solid formed by rotating $\triangle MTH$ continuously around $\overline{MH}$.



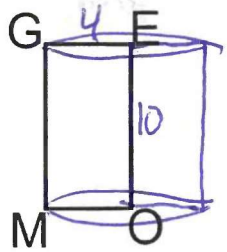
Cone

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

$V = \frac{1}{3}\pi(8)^2(5)$

$V = 335.1$

14. In rectangle GEOM, GE = 4 and EO = 10. Find the volume of the three-dimensional object create by continuously rotating rectangle GEOM about EO in terms of π.



Cylinder

$V = \pi r^2 h$

$V = \pi(4)^2(10)$

$V = 160\pi$

math, up, numeral solver
Graph
10
Graph

15. The base of a pyramid is a rectangle with a width of 6 cm and a length of 8 cm. Find, in centimeters, the height of the pyramid if the volume is $288\ cm^3$.

1) 6
2) 8
3) 18
4) 24

$V = \frac{1}{3}lwh$
$288 = \frac{1}{3}(6)(8)(x)$
equation solver
$x = 18$

or

$V = 288$
$288 = \frac{1}{3}(6)(8)(x)$
$\frac{288}{16} = \frac{16x}{16}$
$18 = x$

16. Find the radius of a sphere with a volume of 576π cubic inches. Find the answer to the nearest tenth of an inch.

1) 4.9
2) 15.1
3) 9.2
4) 7.6

$V = \frac{4}{3}\pi r^3$
$576\pi = \frac{4}{3}\pi x^3$
equation solver
$x = 7.6$

or

$V = 576\pi$
$\frac{576\pi}{\frac{4}{3}\pi} = \frac{\frac{4}{3}\pi x^3}{\frac{4}{3}\pi}$
$3\overline{)432} = x^3$
$76 = x$

17. A rectangular brick that weighs 1824 grams has dimensions that measure 4 cm by 3 cm by 8 cm. To the nearest tenth, what is the density of the brick?

$d = \frac{mass}{volume}$
$d = \frac{1824\ g}{96\ cm^3}$
$d = 19\ g/cm^3$

$V = lwh$
$V = 4(3)(8)$
$V = 96\ cm^3$

18. A metal sphere that has a mass of 8024 grams has a diameter of 10 cm. To the nearest tenth, what is the density of the sphere?

$d = \frac{m}{V}$
$d = \frac{8024\ g}{523...\ cm^3}$
$d = 15.3\ g/cm^3$

$V = \frac{4}{3}\pi r^3$
$V = \frac{4}{3}\pi(5)^3$
$V = 523...\ cm^3$

19. In the year 2020, the village of Depew, New York had an area of 5.1 square miles and a population of 15,069. In the same year, the village of Lancaster, New York had an area of 2.7 square miles and a population of 10,087. Which village had the larger population density in 2020? Justify your answer.

$Pd = \frac{Population}{area}$

Depew
$\frac{15069}{5.1} = 2954...$

Lancaster
$\frac{10087}{2.7} = 3735...$

20. In 2017, Mr. Schlansky moved from Levittown, NY to Commack, NY. Levittown has a population of 51,557 and an area of 6.81 square miles. Commack has a population of 36,553 and an area of 12.25 square miles. Which town has the greater population density? Justify your answer.

Levittown

$\frac{51557}{6.81} = 7570...$

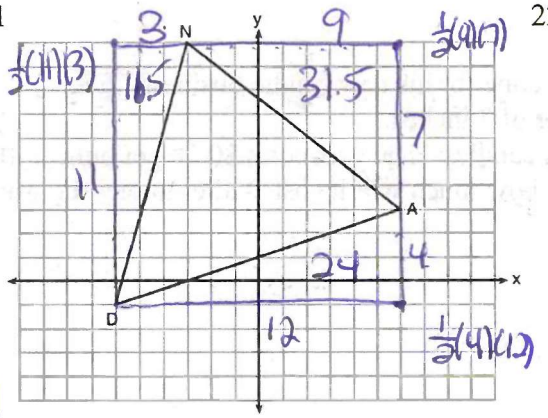
Commack

$\frac{36553}{12.25} = 2983...$

$Pd = \frac{p}{a}$

Find the area of the following triangles:

21



$A_R = lw$

$A_R = 12(11)$

$A_R = 132$

$A_T = \frac{1}{2}lw$

$\frac{1}{2}(11)(3)$

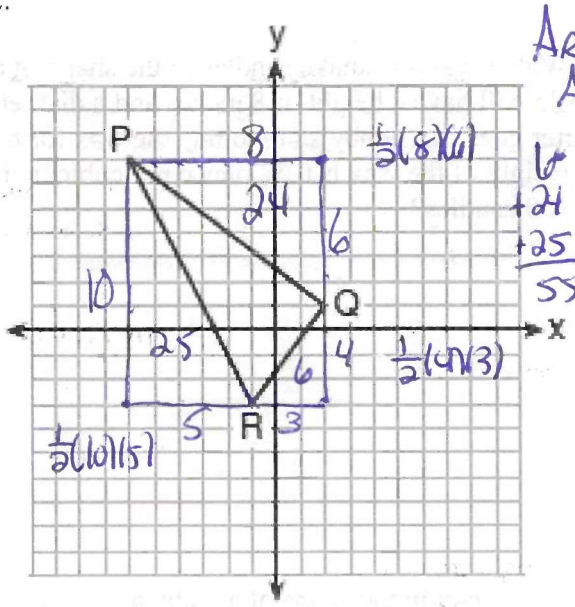
$\frac{1}{2}(9)(7)$

$\frac{1}{2}(9)(12)$

16.5
+31.5
+24
72

132
−72
60

22.



$A_R = 10(8)$

$A_R = 80$

$\frac{1}{2}(8)(6)$

$\frac{1}{2}(4)(3)$

$\frac{1}{2}(10)(5)$

6
+24
+25
55

80
−55
25

23. A triangle has sides that measure 15 and 18 with an included angle of 38°. Find the area of the triangle to the *nearest tenth.*

$A = \frac{1}{2}ab\sin C$

$A = \frac{1}{2}(15)(18)\sin 38$

$A = 83.1$

24. A triangle has sides that measure 16 and 32 with an included angle of 29°. Find the area of the triangle to the *nearest tenth.*

$A = \frac{1}{2}ab\sin C$

$A = \frac{1}{2}(16)(32)\sin 29$

$A = 124.1$

15. Cylindrical bricks are needed to fill a hole in a homeowner's backyard. Each brick is to have a diameter of 4 cm and a height of 2 cm. The weight of the concrete that the brick is going to be made from is 2.1 ounces per cubic centimeter. If the concrete costs $.14 per ounce, how much would it cost to purchase four bricks? Round your answer to the *nearest cent*.

$V = \pi r^2 h$

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

$V = 25.. cm^3$

$25.. cm^3 \cdot \frac{2.1 \text{ oz}}{1 cm^3} \cdot \frac{.14}{1 \text{ oz}} \times 4$

$24.56

16. Walter wants to make candles in the shape of a cone for his new candle business. Each candle will have a height of 8 inches and a diameter of 3 inches.
Walter goes to a hobby store to buy the wax for his candles. The wax costs $0.10 per ounce. If the weight of the wax is 0.52 ounce per cubic inch, how much will it cost Walter to buy the wax for 100 candles?

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

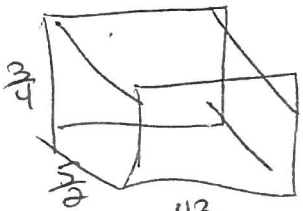
$V = \frac{1}{3}\pi(1.5)^2(8)$

$V = 18... in^3$

$18.. in^3 \cdot \frac{.52 \text{ oz}}{1 in^3} \cdot \frac{.10}{1 \text{ oz}} \times 100$

$98.02

17. A sandbox in the shape of a rectangular prism has a length of 43 inches and a width of 30 inches. Jack uses bags of sand to fill the sandbox to a depth of 9 inches. Each bag of sand has a volume of 0.5 cubic foot. What is the minimum number of bags of sand that must be purchased to fill the sandbox? convert first to ft3



$V = lwh$

$V = (\frac{43}{12})(\frac{5}{2})(\frac{3}{4})$

$V = 6.71875 ft^3$

$6.71875 ft^3 \cdot \frac{1 \text{ bag}}{0.5 ft^3} = 13.4375$

14 bags

$\frac{43 in}{12} = \frac{43}{12} ft$

$\frac{30 in}{12} = \frac{5}{2} ft$

$\frac{9 in}{12} = \frac{3}{4} ft$

28. A concrete footing is a cylinder that is placed in the ground to support a building structure. The cylinder is 4 feet tall and 12 inches in diameter. A contractor is installing 10 footings. If a bag of concrete mix makes $\frac{2}{3}$ of a cubic foot of concrete, determine and state the minimum number of bags of concrete mix needed to make all 10 footings.

$\frac{12in}{12} = 1ft$

$V = \pi r^2 h$

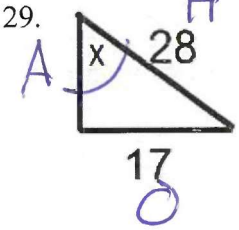
$V = \pi(.5)^2(4)$

$V = 3...ft^3$

$3...ft^3 \cdot \frac{1\ bag}{\frac{2}{3}ft^3} \cdot 10 = 47...$

48 bags

29.



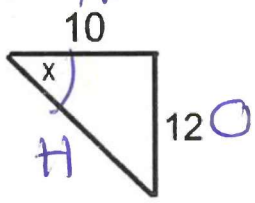
$\sin\theta = \frac{O}{H}$

$\sin x = \frac{17}{28}$

$x = \sin^{-1}\left(\frac{17}{28}\right)$

$x = 37.4$

30.



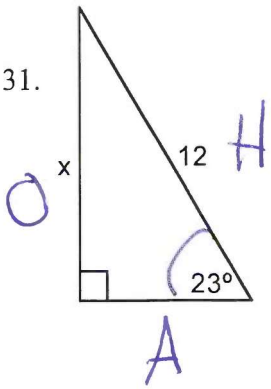
$\tan\theta = \frac{O}{A}$

$\tan x = \frac{12}{10}$

$x = \tan^{-1}\frac{12}{10}$

$x = 50.2$

31.



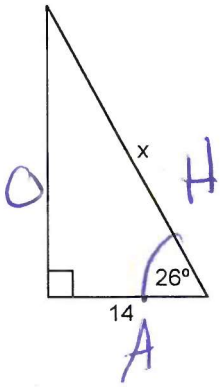
$\sin\theta = \frac{O}{H}$

$\sin 23 = \frac{x}{12}$

$x = 12\sin 23$

$x = 4.7$

32.



$\cos\theta = \frac{A}{H}$

$\cos 26 = \frac{14}{x}$

$x\cos 26 = 14$

$\frac{x\cos 26}{\cos 26} = \frac{14}{\cos 26}$

$x = 15.6$

$S\frac{O}{H}$ $C\frac{A}{H}$ $T\frac{O}{A}$