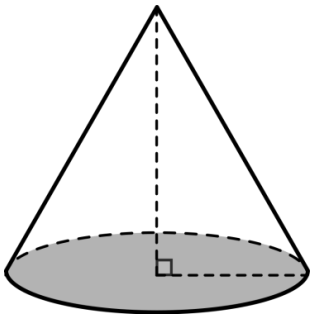
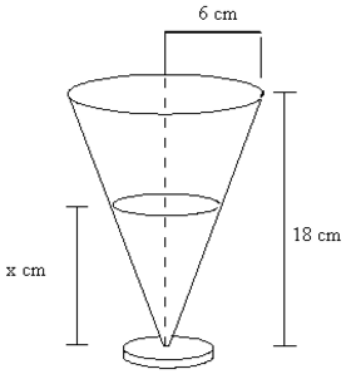
Name_____Date_____Section_____
Units 9&10 Review – 2016-17 (LAB)

1. A cone with a radius of 8 in and an altitude of 16 in is sliced off $\frac{1}{4}$ of the way from the top. What is the radius and area of the cross-section? Explain how you arrived at your answer.



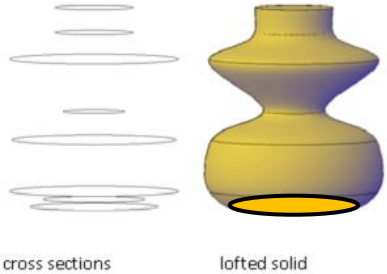
2. A right cone with a height of 18 cm is partially filled with water. Determine the height of the water (the value of x) to the nearest tenth if the radius of the parallel cross section (surface of the water) is 2.7 cm.



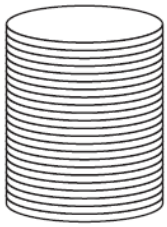
3. Which motions could produce the solid at right?
   a. Dilation
   b. Rotation
   c. Translation
   d. Either a or b

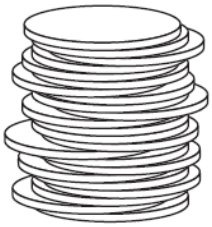
4. The slices of a right regular pentagonal prism could be any of the following except:
   a. Parallelogram
   b. Pentagon
   c. Triangle
   d. Parabola

5. When will all the cross sections of the lofted solid be similar to the circle on the bottom?

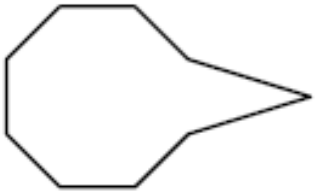


6. Two stacks of 23 quarters each are shown below. One stack forms a cylinder; the other stack does not form a cylinder. Use Cavelieri's Principle to explain why the volumes of these two stacks are equal.



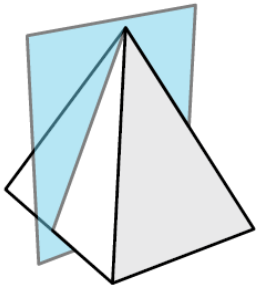


7. Using dissection, identify the 2-D shapes that were used to create the composite planar figure:
   a. A square and a rectangle
   b. A square and a pentagon
   c. A rectangle and a heptagon
   d. An octagon and a triangle

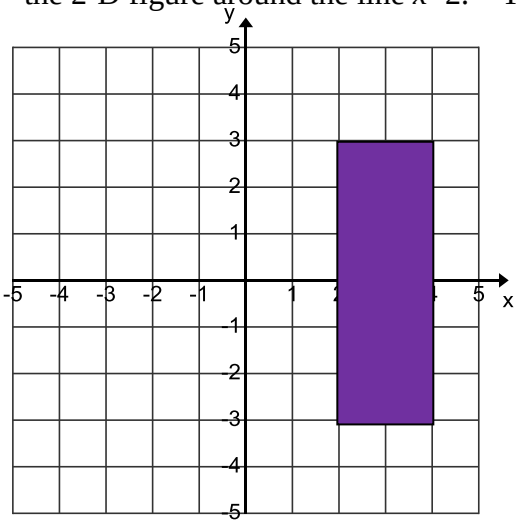


8. Which regular polygon has a rotation of 120^{o} around its center that would carry the polygon onto itself?
   a. Square
   b. Octagon
   c. Triangle
   d. Pentagon

9. Describe the shape of the 2-D planar figure generated by the slice below:



10. Which of the following would describe the 3-D solid as a composite that would be generated by rotating the 2-D figure around the line $x=2$. Try to sketch the solid.



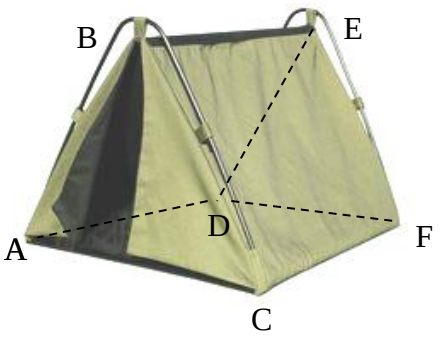
A. Rectangular prism

B. Hollowed out cylinder

C. Cylinder

D. Cone

11. Identify the following for the tent (what will you use as a model?):



A) Base: _____

B) Translation Vector from B: _____

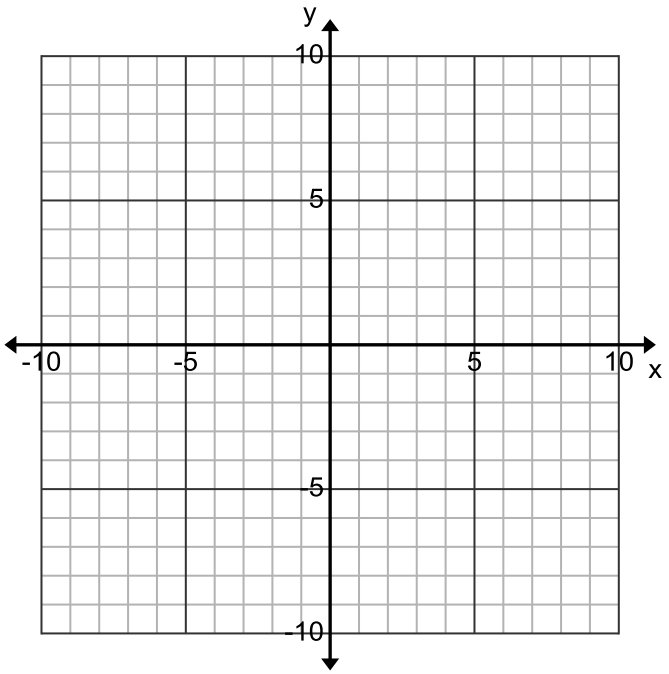
C) Segment skew to $\overline{EF}$ through B: _____

D) Segment parallel to $\overline{AC}$: _____

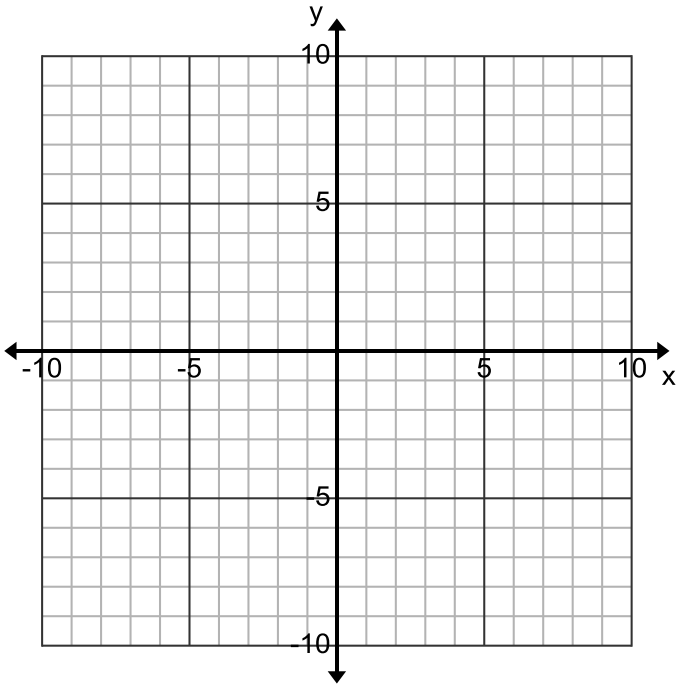
E) Segment perpendicular to $\overline{AC}$: _____

12. Find the exact area of the region bounded by the equations :

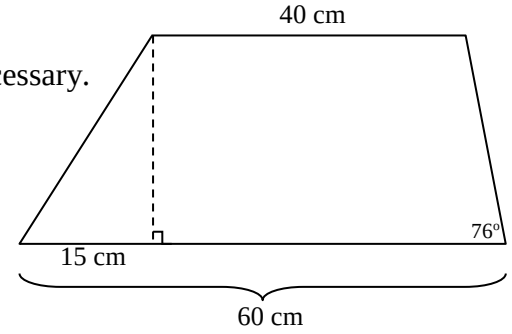
$y = \frac{5}{2}x + 8, \quad x = 4, \quad y = 3$, and the line formed by translating the line y = 3 by a translation vector of < 0, -10 >.



13. Find the perimeter of the triangle with CAT with vertices C(-5,3), A(2,6), T(-1,-1). Classify the triangle by its sides.

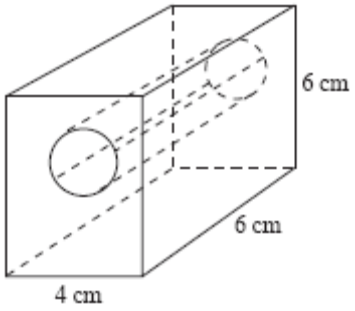


14. Find the height of the trapezoid. Round to the nearest tenth if necessary.

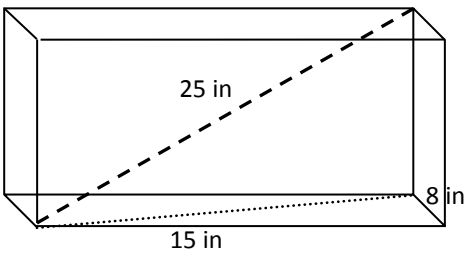


15. A cylinder has a volume of 640π cm^3. Its height is 10 cm. What is the circumference of the base in terms of π?

16. Determine the volume of the wooden block with a cylindrical hole with a diameter of *2 cm* drilled through it. Round your answer to the nearest hundredth of a cubic centimeter.

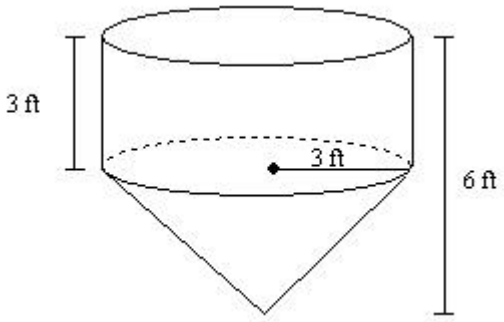


17. Find the height (altitude) of the prism.



18. The metal tank pictured at right is full of water.

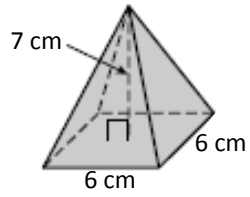
a. Find the volume of the tank in terms of π.



b. If 1 gallon = 0.1337 ft^3, how many gallons will the tank hold? (to the nearest tenth)

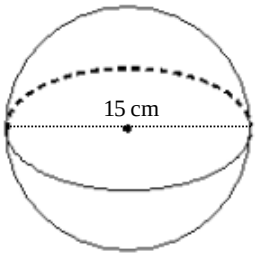
c. After half of the water was poured out, what would be the height of the water remaining in the tank?

19. Find the slant height in simplest radical form of the right regular rectangular pyramid if the altitude is 7 cm.



20. A ball bearing with a diameter of 15 cm made of steel has a density of 7.8 grams/cm^3. What is the mass of the ball bearing, to the nearest tenth of a **kilogram**?

(Recall: $Density = \frac{mass}{Volume}$)



ANSWER KEY LAB

1. The radius of the cross section circle is 2 in by similar triangles since the cross sections are parallel, meeting the AA~ criteria using 2 sets of congruent corresponding angles. Area = 4π in^2

2. 8.1 cm

3. D

4. D

5. When the planes that slice through the lofted solid are parallel to the base

6. Since they are all quarters and there is the same number in each stack, then the altitude heights and cross sections of the two stacks will be equal. Therefore the volumes will be equal by Cavalieri's Principle.

7. D

8. C

9. A triangle

10. C) cylinder

11. Model this as a right triangular prism.
    A) Base: Triangle ABC or Triangle DEF
    B) Translation Vector from B: $\overrightarrow{BE}$
    C) Segment Skew to EF through B: $\overline{BA}$ or $\overline{BD}$
    D) Segment Parallel to AC: $\overline{DF}$
    E) Segment Perpendicular to AC: $\overline{AD}$ or $\overline{CF}$

12. Area = 80 units^2 (trapezoid, right triangle + rectangle or box – right triangle)

13. Perimeter = $2\sqrt{58} + 4\sqrt{2}$ units
    The triangle is Isosceles since the two sides CA=AT=$\sqrt{58}$ are therefore congruent

14. Area = 1002.7 cm^2 (altitude is 5tan76^o)

15. Circumference = 16π cm (radius is 8 cm)

16. Volume = 125.15 cm^3

17. Altitude (Height of prism) is $\sqrt{336}$)

18. a. Tank volume = 36π ft^3 b. 845.9 Gallons c. Height would be 1 ft
19. Slant Height = $\sqrt{58}$ cm

20. Mass = 13.7 kg (13783.7377 grams since volume = 562.5π cm^3)