Unit 4 End-of-Unit Assessment — Study Guide

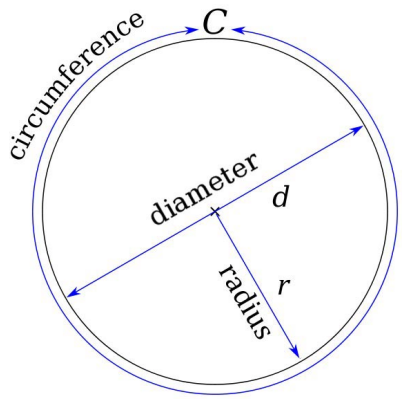
Circles

Definitions

Radius (r) = distance from the center of a circle to the circle's edge
Diameter (d) = distance across a circle, from edge to edge, through the circle's center
Pi (π) = A constant used to determine the circumference of a circle. It rounds to 3.14.
Circumference (C) = distance around a circle
*Note: The radius is always half the distance of the diameter, so d = 2r or r = d/2

Useful Formulas and Relationships

C = 2πr or πd
A = πr^2
π = 3.14
d = 2r
r = d/2



Example Problems

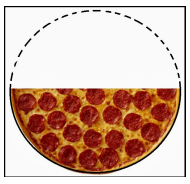
Circumference

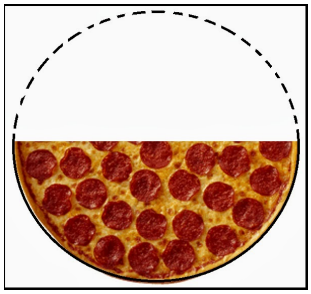
1) A bouncy ball has a diameter if 6 inches. What is the circumference of the ball? Round to the nearest inch.

2) There is a globe in your history class. On the globe, there is an equator drawn on that divides the globe into equal halves. The length of this equator is 26 inches. What is the radius of the globe? Round to the nearest inch.

Area

3) The shape of both of the following pizzas is a semicircle. The first pizza has a diameter of 12 inches. The second pizza has a diameter of 18 inches.



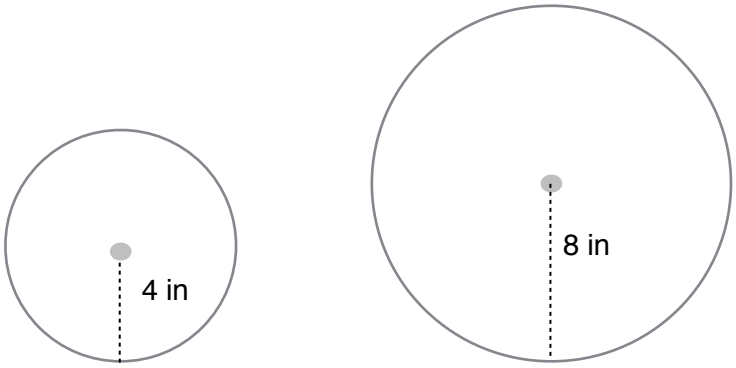


a. Find the area of each pizza.

b. **Approximately** how much larger is the area of the second pizza compared to the first pizza? Use π = 3.14.

Use the following information for questions 4-6:

Ted thinks that if a pizza with a radius of 4 in. costs $12, then a pizza with a radius of 8 in. should cost $24. He explains that since the radius is twice as big, the cost should be twice as much .



4) Do you agree or disagree with Ted?

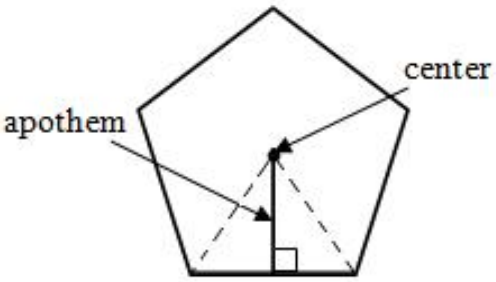
5) Explain your reasoning.

6) Calculate the area of each pizza to illustrate your explanation. Show your work.

Polygons

Definitions

Polygon = a closed shape with at least 3 straight sides and angles.
Regular polygon = a special polygon where all sides and angles are equal
Area of a polygon = the two-dimensional space inside of a polygon measured in squares
Apothem = a line segment from the center of a polygon to the midpoint of one of its sides



Useful Formulas and Relationships

Area of triangle: 1/2 • base • height = $\frac{bh}{2}$

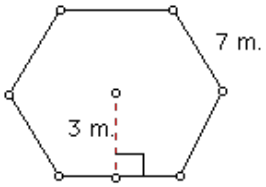
Area of rectangle: length • width = lw

Area of regular polygon: 1/2 • apothem • perimeter = $\frac{ap}{2}$

Example Problems

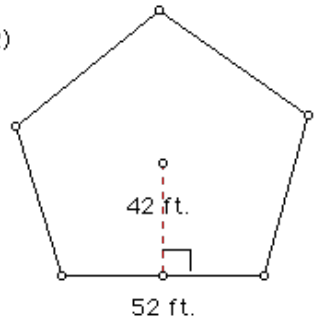
Use the following for problems 7 and 8:

1)



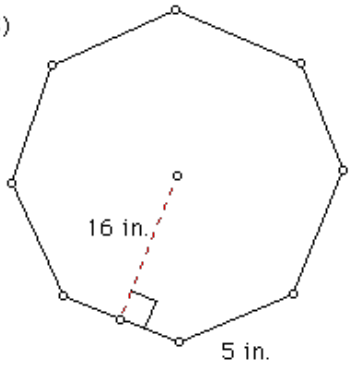
regular hexagon

2)



regular pentagon

3)



regular octogon

7) What are the three different areas of the three shapes above?

8) Approximately how much bigger is the pentagon than the octagon? Remember to convert to matching units!

Ratio & Scale

Definitions

Ratio = a comparison of two numbers. A ratio of "1 to 3" can be written in the following ways:

1 to 3 1:3 $\frac{1}{3}$

Scale = a proportional relationship, in the form of a ratio, usually comparing the size of a model to an actual object. Uses units. Example scales:

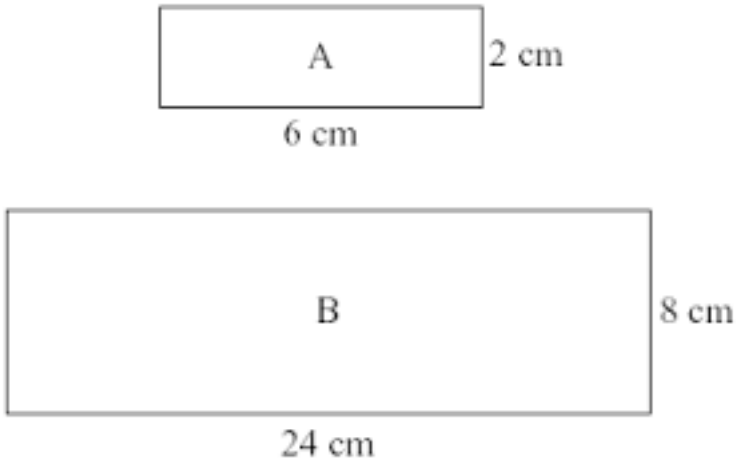
$\frac{3 \text{ inches}}{7 \text{ feet}}$ 1 foot : 10 miles

Useful Formulas and Relationships

To solve a scale problem, convert the units and the numerical ratio given in the scale.

Example problems

9) What is the ratio of the two figures below?



10) If a third rectangle "C" had dimensions of 1.5 kilometers by 4.5 kilometers, what would be the scale from rectangles B to C?

3D Shapes

Definitions

Volume (V) = the quantity of 3-dimensional space enclosed by a closed or solid surface. It is measured in cubes.
Surface Area (SA) = the measure of the total area that the surface of an object occupies. It is measured in squares.
Face = A side of a 3-dimensional object.
Cross Section = the intersection of a 3-dimensional body with a 2-dimensional plane

Useful Formulas and Relationships

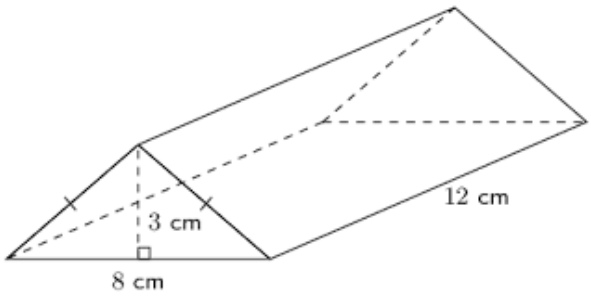
Calculate the volume of a 3-dimensional shape by multiplying the area of its base by its height. For complex shapes, you will need to decompose them into smaller shapes, calculate the volume of each separately, and then combine their separate volumes together.

Calculate the surface area of 3-dimensional object by adding the areas of each of its faces together.

Example Problems

Volume

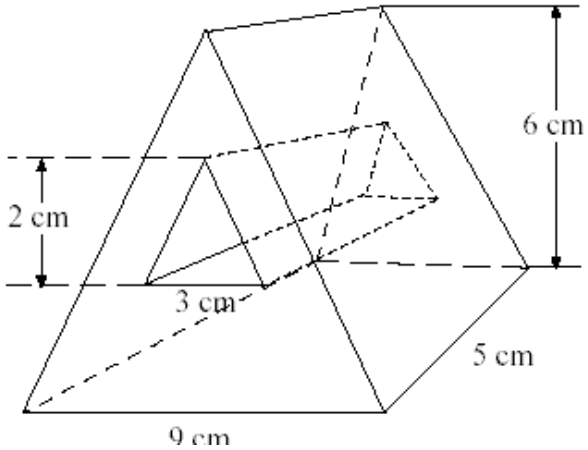
Use the following figure for problems 11-12



11) Find the volume of the figure above. Label the units. _____

12) What would the volume be if all three dimensions (base, width, height) doubled? Label the units.

Use the complex figure to the right for problems 13-14.



13) Find the volume of the triangular prism. Notice that a smaller triangular prism has been removed from the middle, and is not included in the total volume! Label the units.

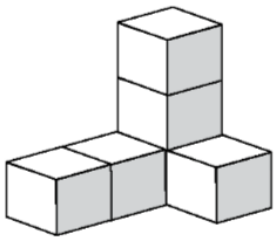
14) Find the area of the front side of the figure (the large triangle with the smaller triangle cut out). Label the units.

Surface Area

Use the following information to solve problems 15-16:

An architect uses this model to represent a building design she would like to create. The scale of the unit cube model is 1:121.

This model is made up of 6 cubes. The side length of each cube is 1 in.



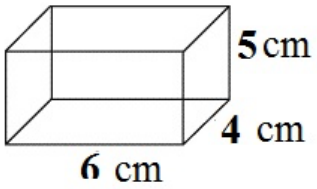
15) What is the surface area of this model, **not including** the sides that are facing the ground? Label the units.

SA = _____

16) What would be the surface area of the real building in square feet, **not including** the sides that are facing the ground? Label the units.

SA = _____

Use the following figure for problem 17.

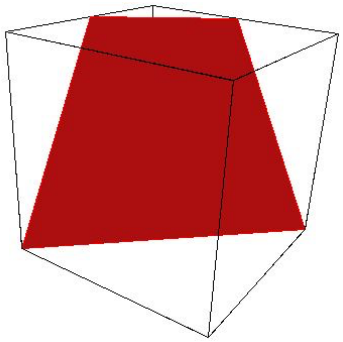


17) Calculate the surface area of the above figure, **including** the face that is facing the ground. Label the units.

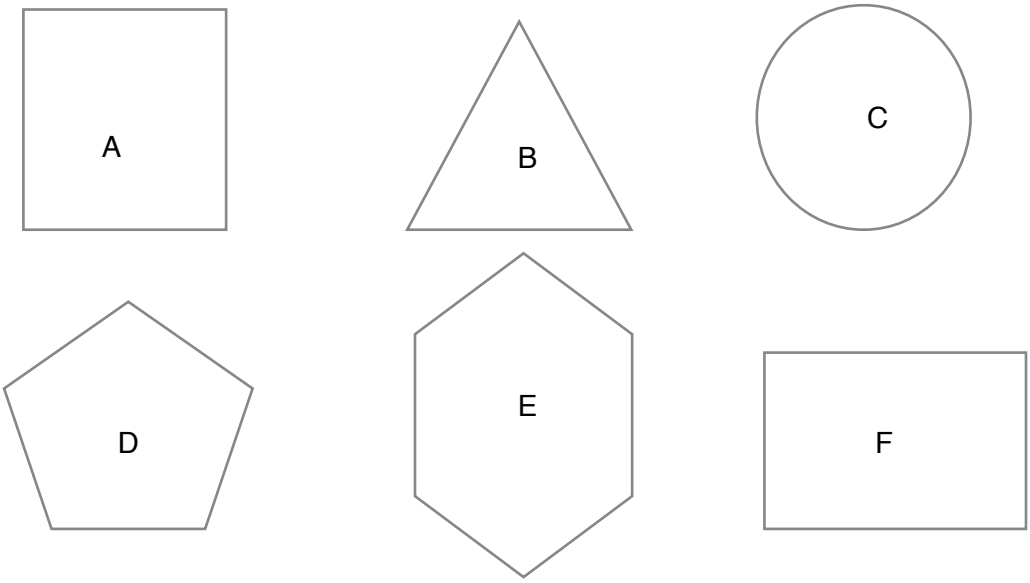
SA = _____

Cross Sections

Use the following figure for problems 15-16. The following diagram shows a cross section of a place passing through a cube, resulting in a trapezoid.



18) Which of the following figures can be the result of a plane slicing through a cube? Circle all that apply:



19) Besides the shapes you've selected above, can you come up with any other shapes that will result from a cross-section of a cube?