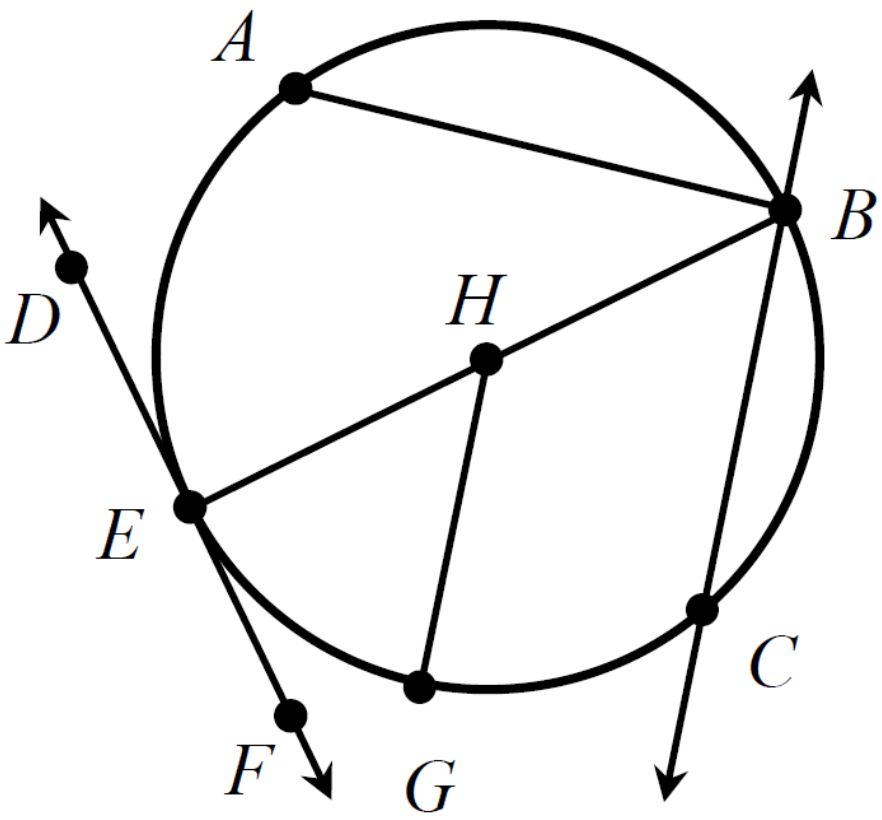
Vocabulary of Circles

Radius – the distance from the center of the circle to the circumference.
Diameter – the longest distance across a circle.
Central Angle: An angle whose vertex is at the center of a circle.
Inscribed Angle: An angle whose vertex is on the circle and whose sides contain chords of a circle.
Semicircle – half of a circle
Major arc – part of a circle that is larger than a semicircle
Minor arc – is a part of a circle that is smaller than a semicircle.
Chord - is a segment whose end points lie on the circumference of a circle.
S**ecant Line** – is a line that intersects a circle at two points.
Tangent Line - is a line that intersects a circle at exactly one point.
Point of tangency – the point where a tangent line touches a circle.



Identify one of each from the picture.

a) Center: _____

b) Chord: _____

c) Diameter: _____

d) Radius: _____

e) Central Angle: _____

f) Inscribed Angle: _____

g) Major Arc: _____

h) Minor Arc: _____

i) Semicircle: _____

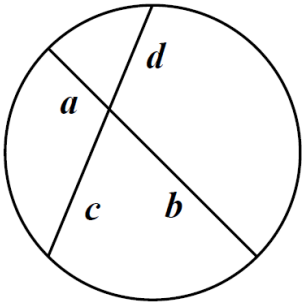
j) Tangent: _____

k) Point of Tangency: _____

l) Secant: _____

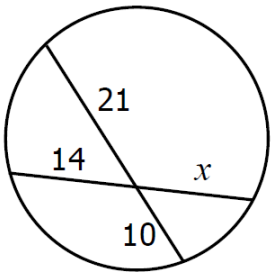
Segments of Circles

Intersecting chords or secants

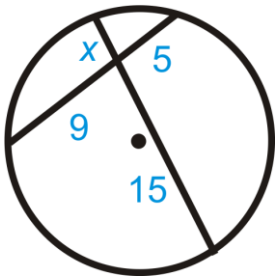


$$a \cdot b = c \cdot d$$

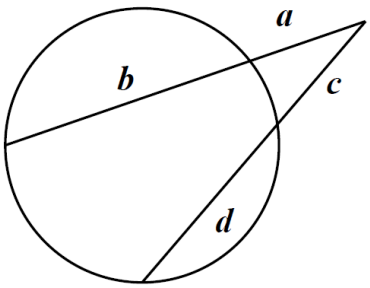
Ex.1



Ex.2

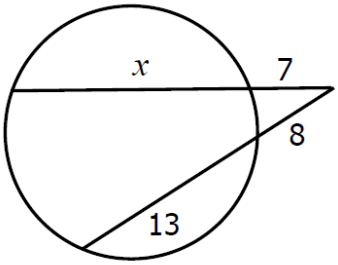


Two Secants Intersecting on the Exterior of a Circle

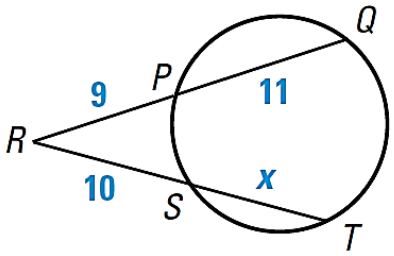


$$a(a+b) = c(c+d)$$

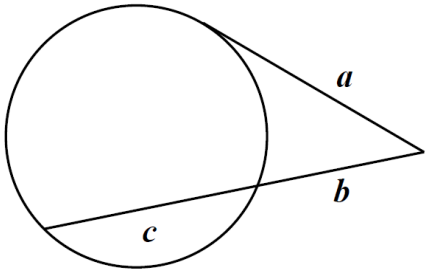
Ex.3



Ex.4

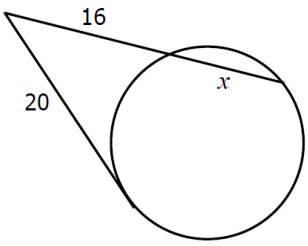


A Secant and a Tangent

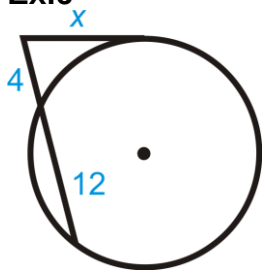


$$a^2 = b(b+c)$$

Ex.5

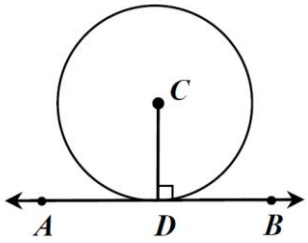


Ex.6



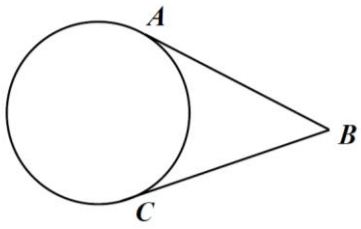
Tangents

A line is tangent to a circle if and only if it is perpedicular to a radius drawn to the point of tangency.



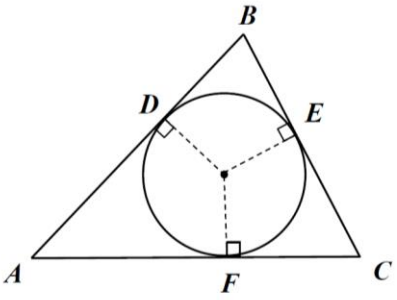
$\overleftrightarrow{AB} \perp \overline{CD}$

If two segments from the same exterior point are tangent to a circle, then they are congruent.

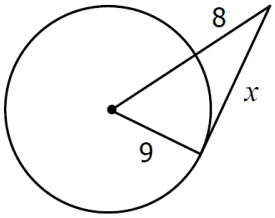


$AB = BC$

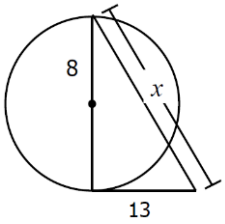
If a polygon is cricumscirbed around a circle, then all sides are tanget to the circle.



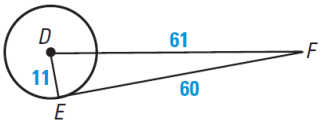
Ex.1 The line segment is tangent to the circle. Find x.



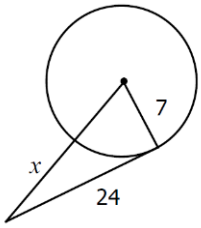
Ex.2 The line segment is tangent to the circle. Find x.



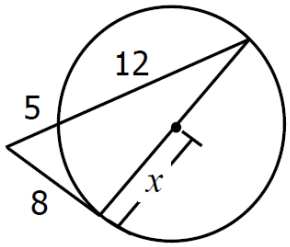
Ex.3 Is the line tangent to the circle?



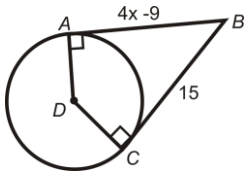
Ex.4 The line segment is tangent to the circle. Find x.



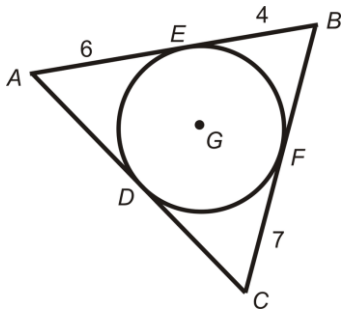
Ex.5 The line segment is tangent to the circle. Find x.



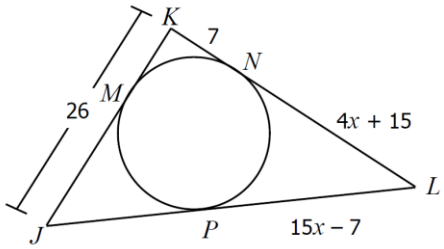
Ex.6 Sovle for x.



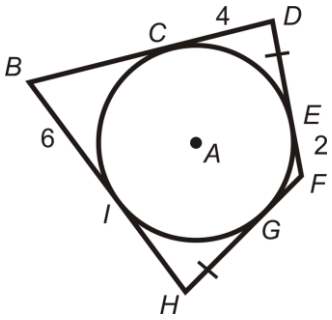
Ex.7 Find the perimeter of ΔABC



Ex.8 Solve for x.



Ex.9 Find the perimeter of BDFH.

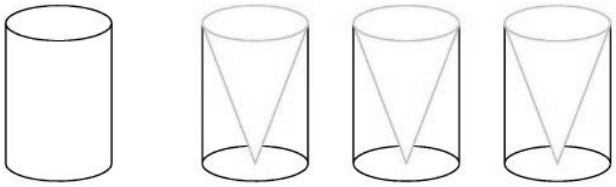


Volume Notes

- Volume is the amount of 3-dimensional space something takes up.

Volume of Cones and Cylinders

It takes 3 cones to fill 1 cylinder that have the same base and height. That is why the volume of a cone is 1/3 the volume of a cylinder (see figure below).

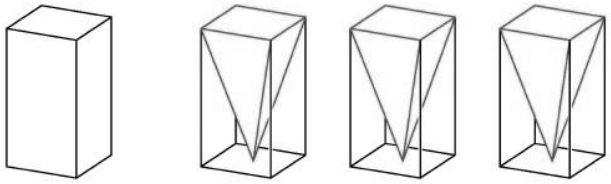


A. If the volume of a cylinder is 90 in^3, what is the volume of a cone with the same base area and height? _____

B. If the volume of a cone is 9 cm^3, what is the volume of a cylinder with the same base area and height? _____

Volume of Prisms and Pyramids

It takes 3 pyramids to fill 1 prism that have the same base and height. That is why the volume of a pyramid is 1/3 the volume of a prism (see figure below).

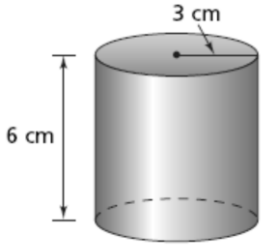


C. If the volume of a prism is 15 in^3, what is the volume of a pyramid with the same base area and height? _____

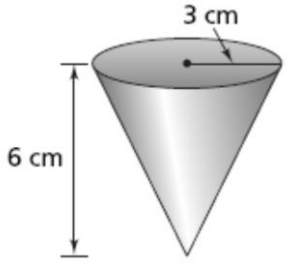
D. If the volume of a pyramid is 12 cm^3, what is the volume of a prism with the same base area and height? _____

Volume Formulas	
Prism	$V = lwh$
Cylinder	$V = \pi r^2 h$
Pyramid	$V = \frac{1}{3}Bh$
Cone	$V = \frac{1}{3}\pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$

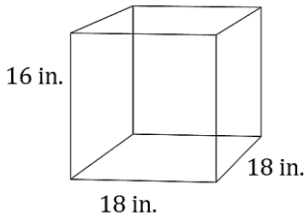
Ex.1 Find the volume of the cylinder below.



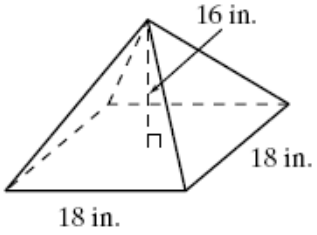
Ex.2 Find the volume of the cone.



Ex.3 Find the volume of the prism below.



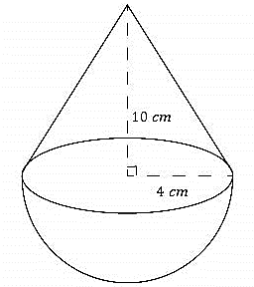
Ex.4 Find the volume of the pyramid.



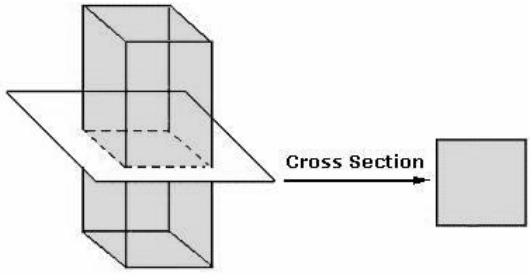
Volume of Composites and Cross Sections

Volume of composite figures
The volume of a composite figure is the sum of the volumes.

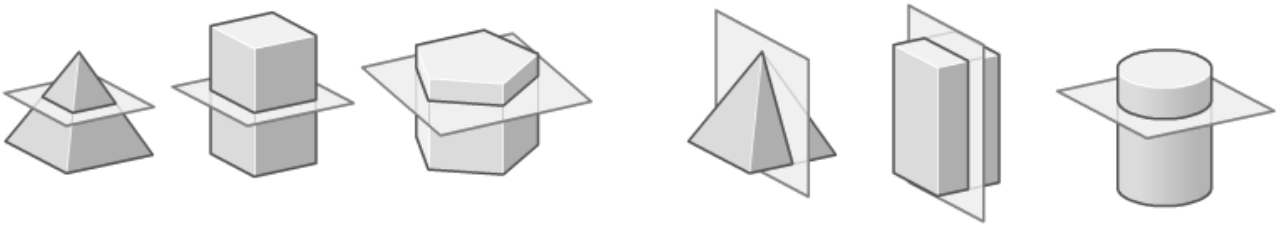
Ex.1 Find the volume.



Cross Sections
A cross sections is two-dimensional figure formed by the intersection of a plane and a solid surface.



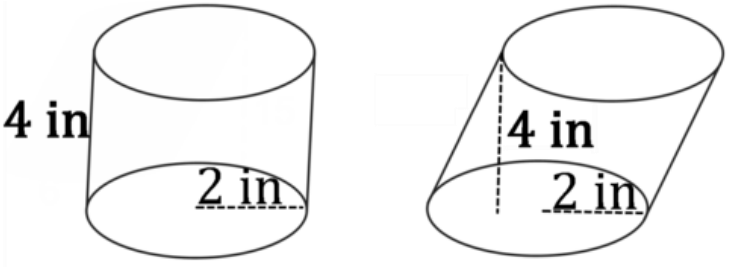
Ex.2 Name the cross section of each figure.



Cavalieri's Principle
Cavalieri's Principle states if the areas of the cross sections of two solids are equal, and the heights are equal, then the volume of the two solids are equal.

A stack of coins above illustrates Cavalieri's Principle. Since there are the same number of coins in each stack, the stacks have the same volume. It doesn't matter how the coins are rearranged, the volume remains constant.

Ex.3 Show that both figures have the same volume.



Density

Density is the quantity per unit of area or volume of some substance being studied.

$$Density_{Area} = \frac{Mass}{Area}$$

$$Density_{Volume} = \frac{Mass}{Volume}$$

1. Perform and record the population density calculations for the prairie dog population below.

Year	# Prairie Dogs	Area (square meters)	Population Density
1985	10	10	1 prairie dog per square meter
1990	30	10	
1995	130	10	
2000	80	10	
2005	2	10	

2. A 10.0 cm^3 sample of copper has a mass of 89.6 g. What is the density of copper?

3. A block of wood 4 cm on each side has a mass of 27 g. What is the density of the block? (Hint, don't forget to find the volume of the wood.)

4. A sample of iron has the dimensions of 2 cm x 3 cm x 2 cm. If the mass of this rectangular-shaped object is 94 g, what is the density of iron?