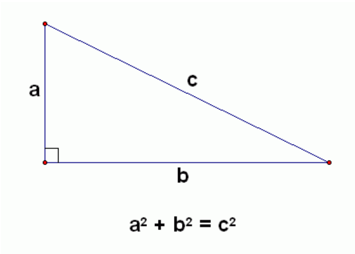
Pythagorean Theorem (I’m sort of hoping we all know this by now):



Pythagorean Triples:
3, 4, 5
5, 12, 13
7, 24, 25
9, 40, 41

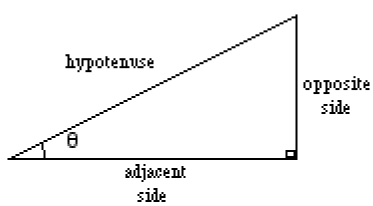
Special Right Triangles:
45-45-90
hyp: $\sqrt{2}$ * leg
30-60-90
hyp ((60-30 side): 2*shorter leg
longer leg (30-90 side) = $\sqrt{3}$ * shorter leg

SOH CAH TOA, this is really fun to memorize, MAKE IT A TATTOO, you’ll be a cool kid like i was :) :) :)
Tangent, Sine, and Cosine are ratios between the lengths of 2 sides of a triangle

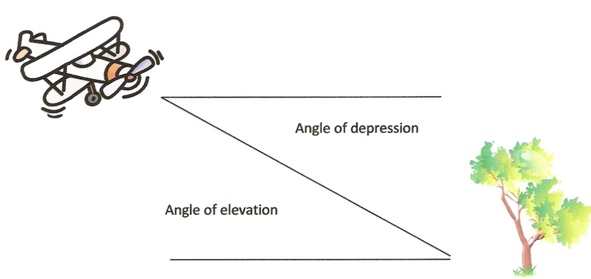
SOH $\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$

CAH $\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}}$

TOA $\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$



Angle of Elevation/Depression



Vectors:
Looks like a ray, but the tail has finite length

Notation: → (under the arrow is the V or the line ex AB)
A vector is defined by 2 elements:

1. Direction <horizontal shift, vertical shift> = <x, y>
2. Magnitude - length

Equal Vectors:
Same magnitude and direction
(changing direction does not change the vector)

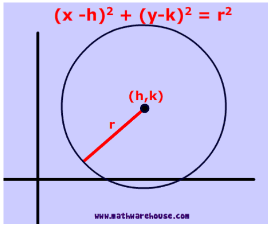
Adding Vectors
Algebraically: <a, b> + <c,d> = <a+c, b+d>
*order does not matter
*vector addition is commutative
Geometrically: add head to tail
*when you add 2 vectors, the answer is a vector

Opposite Vectors:
Same magnitude, but opposite direction
Notation: −→ (with number on the bottom)
ex. a) Graph: v= (1, 3)
b) Find −→ : −→ = <-1, -3>
c) Graph

Subtracting Vectors:
Algebraically: <a, b> - <c, d> - <a-c, b-d>
*vector subtraction is NOT commutative
Geometrically: “add the opposite vector”
a) change into addition
b) switch arrow on second vector
c) add opposite vector to first vector

Scalar Multiplication:
If you multiply a scalar to a vector, the direction stays the same, but the magnitude changes
ex. → (with u underneath) = (2, 3)
3* → (with u underneath) = (2*3, 3*3)

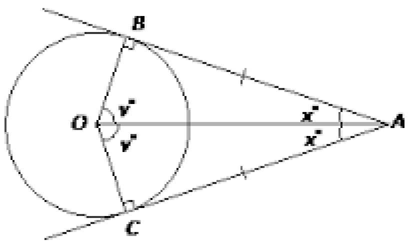
CIRCLES YO:
Equation of a circle:



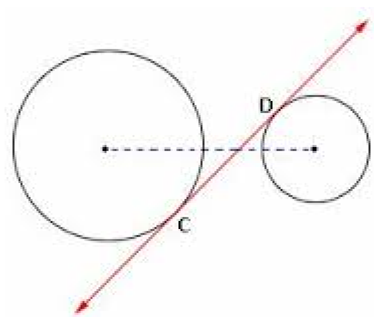
chord: a segment whose endpoints lie on the circle
diameter: is a chord of the circle that contains the center
secant: is a line that contains a chord
tangent: a line in a plane that intersects the circle in exactly one point

Radius-Tangent Theorem:
if a line is tangent to a circle, then the line is perpendicular to the radius drawn at the point of tangency (converse is true)

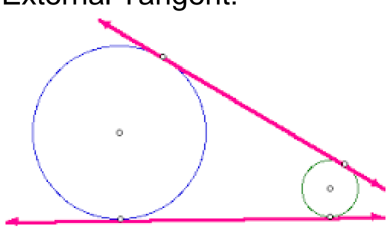
Ice Cream Cone Theorem: Tangents to a circle from a point are congruent



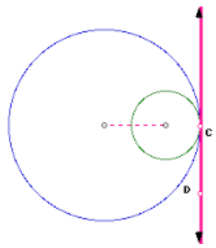
Internal Tangent:



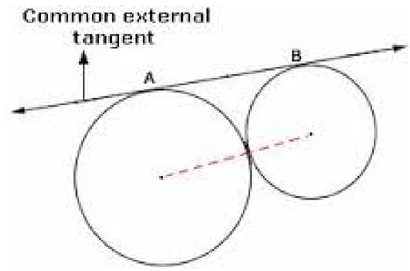
External Tangent:



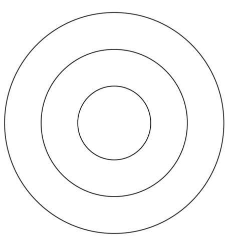
Internally Tangent:



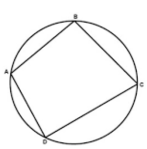
Externally Tangent:



Spheres:
3-D (aka magic): all points in the space are equidistant from the center
Congruent Circles/Spheres:
All circles and spheres with congruent radius
Definition of Concentric Circles:
Circles that lie in the same plane and have the same center

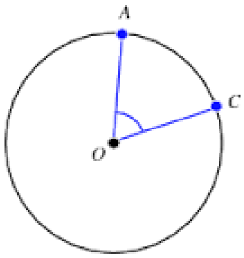


Inscribed vs Circumscribed:
-the polygon is inscribed in the circle

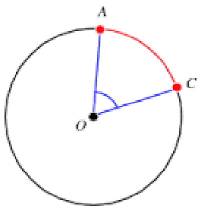


-the circle is circumscribed about the polygon
-circle inscribed in polygon
-polygon circumscribed in circle

Arcs and Central Angles
Central angle: vertex of an angle located at the center



arc: unbroken piece of circle



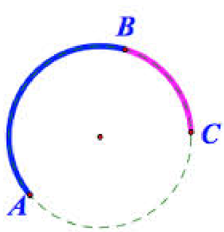
There are 2 ways to look at an arc:

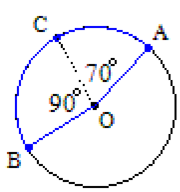
1. length of arc (part of the circumference of a circle)
2. measure of the arc (in degrees)

Theorem: the measure of an arc = the measure of the central angle
Minor Arc: an arc that is in between 2 points in a circle
Major Arc: more than half of the circle
Semicircle: half of a circle

Arc Addition Postulate:

$m\overset{\frown}{ABC} = m\overset{\frown}{AB} + m\overset{\frown}{BC}$

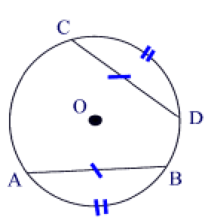




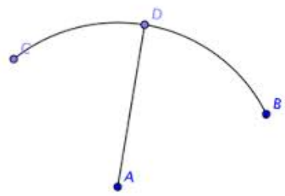
Arc Addition:
arc AB =
arc AC + arc CB
= 160°

Chord Theorem:

1) congruent arcs have congruent chords
2) congruent chords have congruent arcs

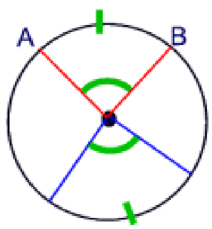


SEE NEXT PAGE
Midpoint of an Arc:



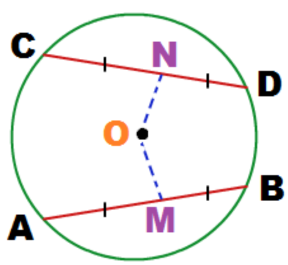
D is the midpoint of the arc CB if CD is congruent to DB

Congruent Arcs: within the same circle of congruent circles, if has the same central angle
Theorem: in the same circle, or in congruent circles, 2 minor arcs are congruent iff (if and only if) their central angles are congruent.

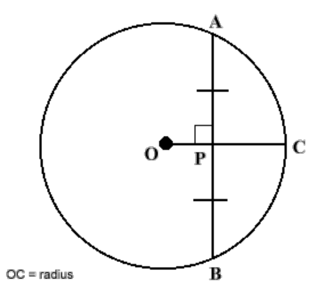


Theorem: in the same circle or in congruent circles,

1) chords equally distant from the center are congruent
2) congruent chords are equally distant from the center

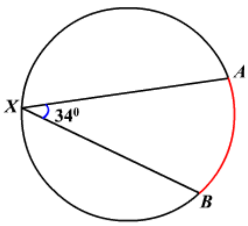


Theorem: A diameter that is perpendicular to a chord bisects the chord and it’s arc.

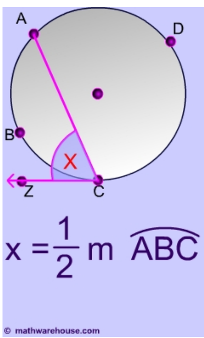


Inscribed Angles:

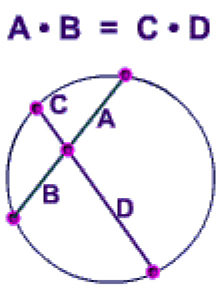
Definition: An angle whose vertex is on a circle, and whose sides contain chords of the circle



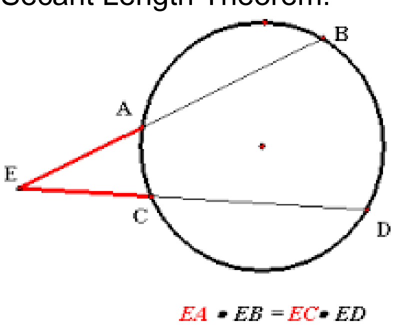
Theorem: the m< formed by a chord and a tangent are equal to ½ of the m< of the intercepted arc



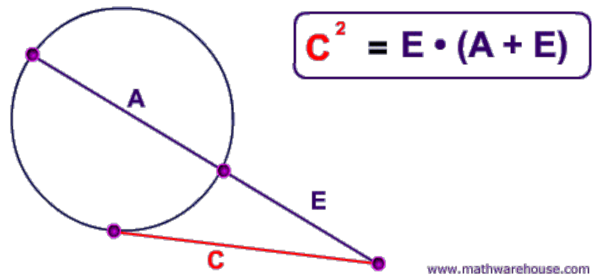
Chord Length Theorem:



Secant Length Theorem:

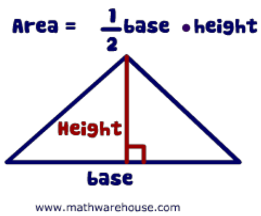


Tangent - Tangent Theorem



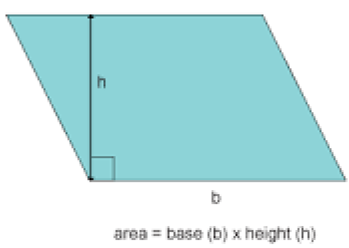
MOVING ON TO CHAPTER 11 Y'ALLS

Area of a triangle:
a = ½ (base*height)

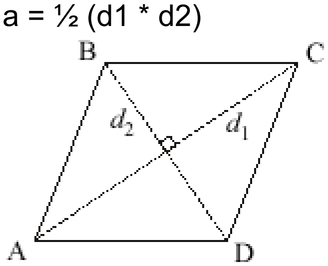


Area of a rectangle:
a = length * width

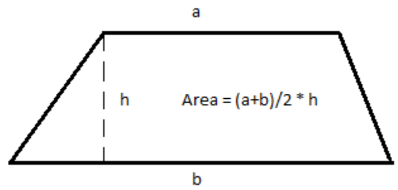
Area of a parallelogram:
a = base * height



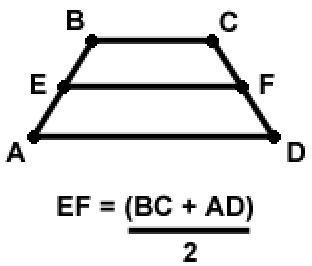
Area of a rhombus:
a = ½ (d1 * d2)



Area of a trapezoid:
a = b1+b2/2 * height

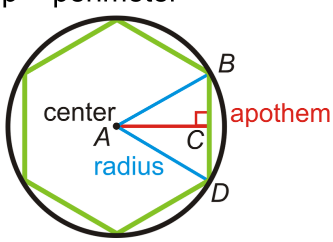


The median of a trapezoid is a line segment that connects the midpoints of the 2 legs of a trapezoid

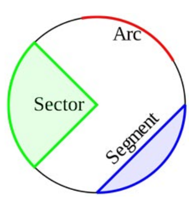


CIRCLE FORMULA TIME YAY
circumference: c = 2πr
area: a = πr^2

Area of a regular polygon: A = ½ ap
a = apothem
p = perimeter

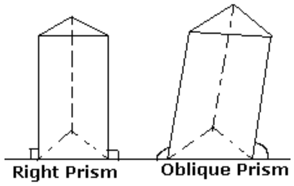


Alrighty children, back to circles
Sector of a circle:

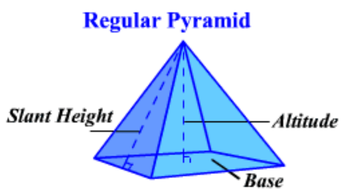


Area of a sector: n/360*πr^2
(n = angle of thingy)
Arc length: n/360* πd

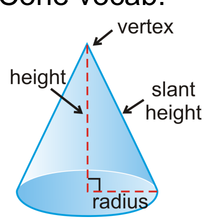
CHAPTER 12 (aka Areas and Volumes of Solids)
Right prism: in general, lateral faces are parallelograms
Right polygon: if lateral faces are rectangles
Oblique Prism: lateral faces are not rectangles



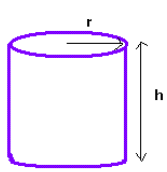
Lateral Area: perimeter of base * height
Surface Area: TA = LA + (2*base)
Volume: base*height
Regular Pyramids:
LA: ½ * perimeter * lateral height
TA: LA + area of base



Volume: V = ⅓ base * height
CONES YAYYY:
Cone vocab:



height is the same as altitude
LA = πrl
TA = πrl + πr^2 (l = slant height)
V = ⅓ πr^2h
Cilinder:



LA = πdh
TA = πdh + 2πr^2

$V = \pi r^2 h$
I really honestly dont give a shit about scale factors, but i guess we need to know it, so here are the basics… I'm not putting all the notes here.

1. ratio of corresponding perimeters: a:b
2. ratio of base areas, lateral areas, and total areas: $a^2:b^2$
3. ratio volumes: a^3:^3

2 similar cones have base area ratios of 4:9

a. radii: 2:3
b. heights: 2:3
c. total area: 4:9
d. volumes: 8:27

OK NOW BACK TO PYRAMIDS #goteam
LA of a regular pyramids: ½ perimeter or base * slant height
$V = \frac{1}{3} Bh$

CHAPTER 14 (aka transformations)
idgaf about this unit, do this yourself...