

Statements

conditional	an "if, then" statement ($p \rightarrow q$)
converse	switches hypothesis and conclusion ($q \rightarrow p$)
biconditional	combination of condition and its converse "if and only if"
Law of Detachment	conditional, and hypothesis is true, conclusion is true
Law of Syllogism	when one true conditional is the same as the hypothesis is another true statement
negation	the negation changes truth value
inverse	negates hypothesis and conclusion
contrapositive	switches hypothesis and negates both

Properties

Equality

addition property	if $a=b$, then $a+c=b+c$
subtraction property	if $a=b$, then $a-c=b-c$
multiplication property	if $a=b$, then $ac=bc$
reflexive property	$a=a$
transitive property	if $a=b$, then $b=a$
substitution property	if $a=b$ then b can replace a
Congruence	
reflexive property	$AB = AB, A = A$
symmetric property	if $AB = CD$, then $CD = AB$
transitive property	if $AB = CD$ and $CD = EF$, then $AB = EF$

Triangles

Congruence

ASA	angle, included side, angle
AAS	angle, angle, non-included side
SSS	side, side, side
SAS	side, included angle, side
HL	hypotenuse, leg
CPCTC	after triangles proved congruent

Right Triangles

tangent (tan)	opposite/adjacent
sine (sin)	opposite/hypotenuse

Triangles (cont)

cosine (cos)	adjacent/hypotenuse
Special Right Triangles	
45-45-90	legs: congruent, hyp: $\sqrt{2}$ (leg)
30-60-90	hyp: 2(short leg) long leg: $\sqrt{3}$ (short leg)
Similarity	
AA~	two angles equal
SAS~	ratio of sides is equal, included angle congruent
SSS~	all side ratios equal
Pythagorean Theorem	$a^2+b^2=c^2$ (right)
obtuse	$c^2 > a^2+b^2$
acute	$c^2 < a^2+b^2$
Triples	(3,4,5) (5,12,13) (8,15,17)
Other	
if, $a+b > c$	then, three sides form a triangle

Tangent Lines

tangent	line that intersects circle at one point
point of tangency	where circle and tangent intersect
congruent segments	the two segments from one point of tangency

Properties of Parallel Lines

transversal	line that intersects two coplanar lines at distinct points
alternate interior angles	opposite side of transversal inside of two lines
same side interior angles	same side of transversal inside of two lines
corresponding angles	overlap if overlaid
same side exterior angles	same side of transversal outside of two lines
alternate exterior angles	opposite side of transversal outside of two lines

CONVERSES -> PARALLEL LINES



Formulas

AREA

sector $\text{degrees "represented"} \times \pi r^2$

circle πr^2

triangle $1/2 bh$ **or** $1/2 bc(\sin A)$

trapezoid $1/2h(b^1+b^2)$

kite or rhombus $1/2(d^1)(d^2)$

rectangle bh

parallelogram bh

Length

circumference $2\pi r$ **or** πd

arc length $\text{central angle}/360 \times 2\pi r$

Coordinate Geometry

distance

midpoint

Circles in Triangles

point of concurrency point at which 3 or more lines intersect

circumcenter point of concurrency, (p. bisectors)

circumscribed circle through all vertices

incenter point of concurrency, (a. bisectors)

inscribed circle largest contained circle

median of triangle endpoints: vertex, median

centroid point of concurrency, (medians)

altitude p. segment, vertex to opposite side

Vectors

vector any quantity with magnitude (size) and direction

resultant vector $\mathbf{a+c} = \langle x^1,x^2 \rangle \langle y^1,y^2 \rangle$



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Not published yet.

Last updated 5th June, 2016.

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