Geometry B

Mathematics Curriculum Framework

Revised 2004
Amended 2006

Expired June 30, 2013

Course Title: Second Part Geometry 1
Course/Unit Credit: 1 of 2 units required for course completion
Course Number: 431200
Teacher Licensure: Please refer to the Course Code Management System (https://adedata.arkansas.gov/ccms/) for the most current licensure codes.
Grades: 9-12
Prerequisite: Algebra I (or equivelant) and Geometry A

Geometry B

Geometry A is the first part of a two-credit geometry course. Geometry B is the second part of a two-credit geometry course. Students who successfully complete Geometry A and Geometry B will meet the Geometry requirement for graduation. This course will help students develop communication skills, enhance reasoning, and make connections within mathematics to other disciplines and the real world. In this course, students are engaged in problematic situations in which they form conjectures, determine the validity of these conjectures, and defend their conclusions to classmates. Students will use physical models and appropriate technology throughout this course in their investigations. **It is strongly recommended to regularly assess Geometry A skills to help drive the instruction of Geometry B. All SLEs taught in Geometry A should be revisited in Geometry B as necessary**.

Strand	Standard
Language of Geometry	
	1. Students will develop the language of geometry including specialized vocabulary, reasoning, and application of theorems, properties, and postulates.
Triangles	
	2. Students will identify and describe types of triangles and their special segments. They will use logic to apply the properties of congruence, similarity, and inequalities. The students will apply the Pythagorean Theorem and trigonometric ratios to solve problems in real world situations.
Measurement	
	3. Students will measure and compare, while using appropriate formulas, tools, and technology to solve problems dealing with length, perimeter, area and volume.
Relationships between two- and three-dimensions	
	4. Students will analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships.
Coordinate Geometry and Transformations	
	5. Students will specify locations, apply transformations and describe relationships using coordinate geometry.

* denotes amended changes to the framework

Expired June 30, 2013

Content Standard **1.** Students will develop the language of geometry including specialized vocabulary, reasoning, and application of theorems, properties, and postulates.

LG.1.G.1	Define, compare and contrast *inductive reasoning* and *deductive reasoning* for making predictions based on real world situations • *Venn Diagrams* • *Matrix Logic* • *Conditional Statements* (statement, *inverse, converse*, and *contrapositive*) • **Figural patterns*
LG.1.G.2	**TAUGHT IN GEOMETRY A**
LG.1.G.3	**TAUGHT IN GEOMETRY A**
LG.1.G.4	**TAUGHT IN GEOMETRY A**
LG.1.G.5	**TAUGHT IN GEOMETRY A**
LG.1.G.6	Give justification for conclusions reached by deductive reasoning *State and prove key basic theorems in geometry (i.e., Pythagorean theorem, the sum of the measures of the angles of a triangle is 180°, and the line joining the midpoints of two sides of a triangle is parallel to the third side and half its length.

Expired June 30, 2013

Key: LG.1.G.1 = Language of Geometry. Standard 1. Geometry. 1st Student Learning Expectation

Triangles

Content Standard 2. Students will identify and describe types of triangles and their special segments. They will use logic to apply the properties of congruence, similarity, and inequalities. The students will apply the Pythagorean Theorem and trigonometric ratios to solve problems in real world situations.

T.2.G.1	**TAUGHT IN GEOMETRY A**
T.2.G.2	**TAUGHT IN GEOMETRY A**
T.2.G.3	**TAUGHT IN GEOMETRY A**
T.2.G.4	Apply the Pythagorean Theorem and its converse in solving practical problems
T.2.G.5	Use the *special right triangle relationships* (30°-60°-90° and 45°-45°- 90°) to solve problems
T.2.G.6	Using *trigonometric ratios*(*sine, cosine, tangent*), determine lengths of sides and measures of *angles* in right triangles including *angles of elevation* and *angles of depression*
T.2.G.7	*Use similarity of right triangles to express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given lengths of sides

Expired June 30, 2013

Key: T.2.G.1 = Triangles. Standard 2. Geometry. 1st Student Learning Expectation

Measurement

Content Standard 3. Students will measure and compare, while using appropriate formulas, tools, and technology to solve problems dealing with length, perimeter, area and volume.

M.3.G.1	Calculate probabilities arising in geometric contexts (Ex. Find the probability of hitting a particular ring on a dart board.)
M.3.G.2	Apply, using appropriate units, appropriate formulas (*area, perimeter, surface area, volume*) to solve application problems involving *polygons*, *prisms, pyramids, cones, cylinders, spheres* as well as composite figures, expressing solutions in both exact and approximate forms
M.3.G.3	Relate changes in the measurement of one *attribute* of an object to changes in other attributes (Ex. How does changing the *radius* or height of a cylinder affect its surface area or volume?)
M.3.G.4	Use (given similar geometric objects) proportional reasoning to solve practical problems (including *scale drawings*)
M.3.G.5	*Identify and apply properties of and theorems about parallel and perpendicular lines to prove other theorems and perform basic Euclidean constructions

Expired June 30, 2013

Key: M.3.G.1 = Language of Geometry. Standard 1. Geometry. 1st Student Learning Expectation

Content Standard 4. Students will analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.

R.4.G.1	**TAUGHT IN GEOMETRY A**
R.4.G.2	**TAUGHT IN GEOMETRY A**
R.4.G.3	Identify and explain why figures *tessellate*
R.4.G.4	Identify the attributes of the five *Platonic Solids*
R.4.G.5	Investigate and use the properties of angles (*central* and *inscribed*) *arcs, chords, tangents*, and *secants* to solve problems involving *circles*
R.4.G.6	Solve problems using inscribed and *circumscribed* figures
R.4.G.7	Use *orthographic drawings* (top, front, side) and *isometric drawings* (corner) to represent three-dimensional objects
R.4.G.8	Draw, examine, and classify *cross-sections* of three-dimensional objects
R.4.G.9	*Explore non-Euclidean geometries, such as spherical geometry and identify its unique properties which result from a change in the parallel postulate

Expired June 30, 2013

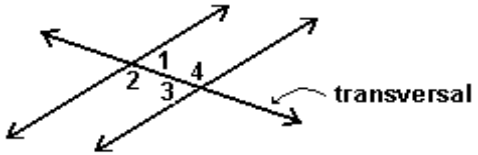
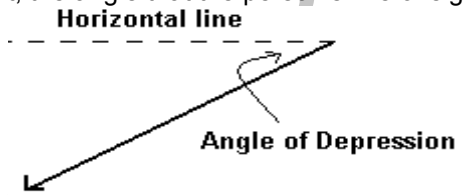
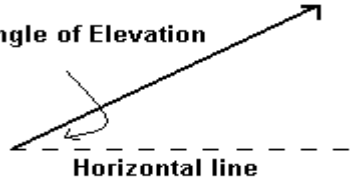
Key: R.4.G.1 = Relationships between two- and three- dimensions. Standard 4. Geometry. 1st Student Learning Expectation

Content Standard 5. Students will specify locations, apply transformations and describe relationships using coordinate geometry.

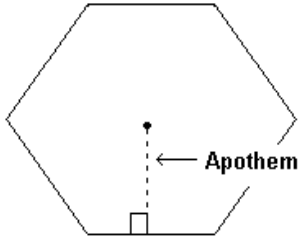
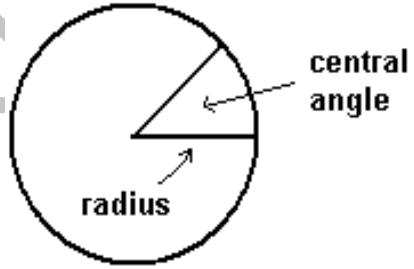
CGT.5.G.1	**TAUGHT IN GEOMETRY A**
CGT.5.G.2	**TAUGHT IN GEOMETRY A**
CGT.5.G.3	**TAUGHT IN GEOMETRY A**
CGT.5.G.4	**TAUGHT IN GEOMETRY A**
CGT.5.G.5	Determine, given a set of points, the type of figure based on its properties (parallelogram, isosceles triangle, trapezoid)
CGT.5.G.6	Write, in standard form, the equation of a circle given a graph on a coordinate plane or the center and radius of a circle
CGT.5.G.7	Draw and interpret the results of transformations and *transformations* on figures in the coordinate plane • *translations* • *reflections* • *rotations* (90°. 180°, clockwise and counterclockwise about the origin) • *dilations* (scale factor)

Expired June 30, 2013

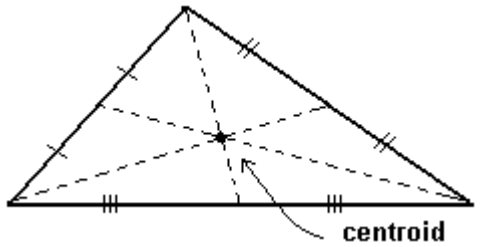
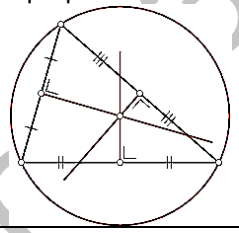
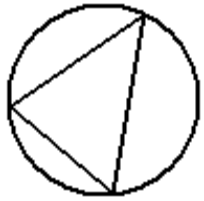
Key: CGT.5.G.1 = Coordinate Geometry and Transformations. Standard 5. Geometry. 1st Student Learning Expectation

Adjacent angles	Two coplanar angles that share a vertex and a side but do not overlap
Alternate interior angles	Two angles that lie on opposite sides of a transversal between two lines that the transversal intersects 
Altitude of a triangle	A perpendicular segment from a vertex of a triangle to the line that contains the opposite side
Angle	Two non-collinear rays having the same vertex
Angle of depression	When a point is viewed from a higher point, the angle that the person's line of sight makes with the horizontal 
Angle of elevation	When a point is viewed from a lower point, the angle that the person's line of sight makes with the horizontal 

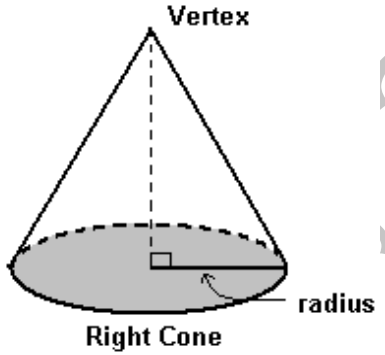
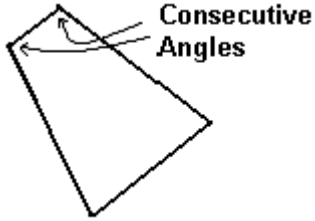
Expired June 30, 2013

Apothem	The distance from the center of a regular polygon to a side 
Arcs	An unbroken part of a circle
Area	The amount of space in square units needed to cover a surface
Attributes	A quality, property, or characteristic that describes an item or a person (Ex. color, size, etc.)
Biconditional	A statement that contains the words "if and only if" (This single statement is equivalent to writing both "if p, then q" and its converse "if q then p.)"
Bisector	A segment, ray or line that divides into two congruent parts
Center of a circle	The point equal distance from all points on the circle
Central angle	An angle whose vertex is the center of a circle (Its measure is equal to the measure of its intercepted arc.) 

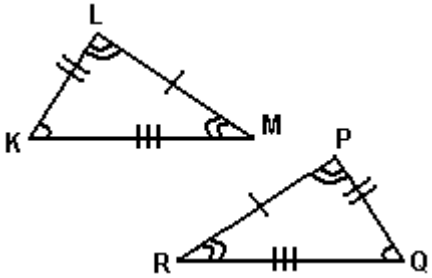
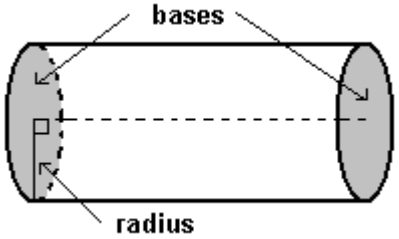
Expired June 30, 2013

Centroid	The centroid of the triangle is the point of congruency of the medians of the triangle. 
Chords	A segment whose endpoints lie on the circle
Circle	The set of all points in a plane that are an equal distance (radius) from a given point (the center) which is also in the plane
Circumcenter	A circumcenter is the point of concurrency of the perpendicular bisectors of a triangle. 
Circumference	The distance around a circle
Circumscribed	A circle is circumscribed about a polygon when each vertex of the polygon lies on the circle. (The polygon is I inscribed in the circle.) 
Collinear points	Points in the same plane that lie on the same line
Complementary angles	Two angles whose measures add up to 90 degrees
Concentric circles	Concentric circles lie in the same plane and have the same center

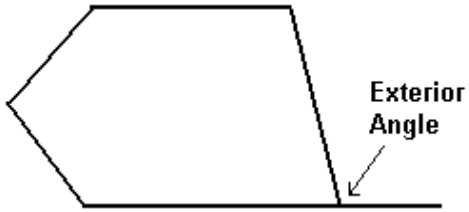
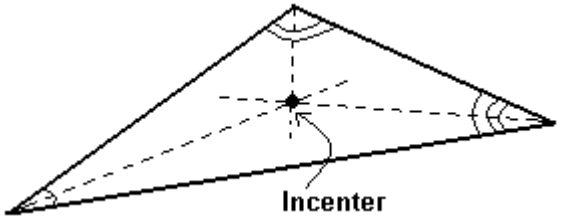
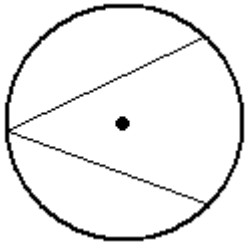
Expired June 30, 2013

Conditional statements	A statement that can be written in the form "if p, then q" (Statement p is the hypothesis and statement q is the conclusion.)
Cone	A three dimensional figure with one circle base and a vertex 
Congruent	Having the same measure
Conjecture	Something believed to be true but not yet proven (an educated guess)
Consecutive angles	In a polygon, two angles that share a side 
Consecutive sides	In a polygon, two sides that share a vertex
Contrapositive	The contrapositive of a conditional statement ("if p, then q" is the statement "if not q, then not p")
Converse	The converse of the conditional statement interchanges the hypothesis and conclusion ("if p, then q, becomes "if q, then p")
Convex polygon	A polygon in which no segment that connects two vertices can be drawn outside the polygon
Coordinate geometry	Geometry based on the coordinate system

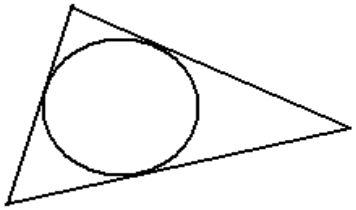
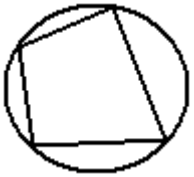
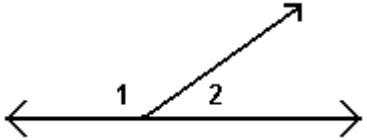
Expired June 30, 2013

Coordinate plane	A grid formed by two axes that intersect at the origin (The axes divided the plane into 4 equal quadrants.)
Coplanar points	Points that lie in the same plane
Corollary	A corollary of a theorem is a statement that can easily be proven by using the theorem.
Corresponding parts	A side (or angle) of a polygon that is matched up with a side (or angle) of a congruent or similar polygon 
Cosine	In a right triangle, the ratio of the length of the leg adjacent to the angle to the length of the hypotenuse
Cross-section	A cross-section is the intersection of a solid and a plane.
Cylinder	A space figure whose bases are circles of the same size 
Deductive reasoning	Using facts, definitions, and accepted properties in a logical order to reach a conclusion or to show that a conjecture is always true
Dilations	Transformations producing similar but not necessarily congruent figures

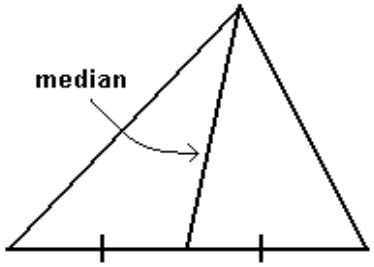
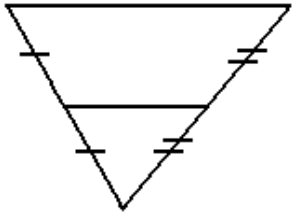
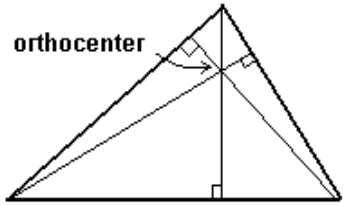
Expired June 30, 2013

Exterior angle of a polygon	An angle formed when one side of the polygon is extended (The angle is adjacent to an interior angle of the polygon.) 
Geometric mean	If a, b, and x are positive numbers, and a/x = x/b, then x is the geometric mean of a and b.
Incenter	The incenter of a triangle is the point of congruency of the angle bisectors of the triangle. 
Inductive reasoning	A type of reasoning in which a prediction or conclusion is based on an observed pattern
Inscribed angle	An angle whose vertex is on a circle and whose sides are chords of the circle 

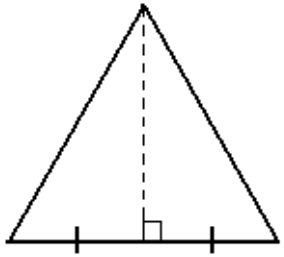
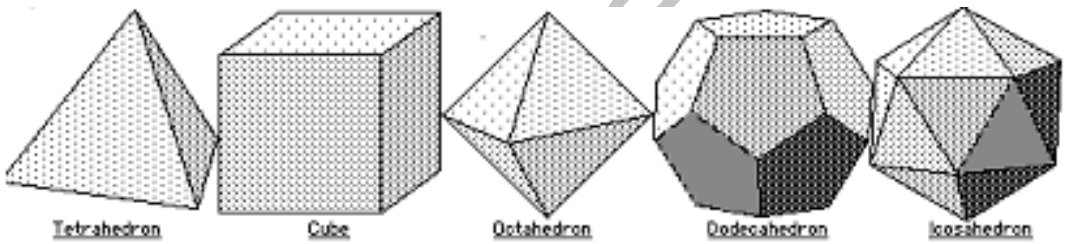
Expired June 2013

Inscribed circle	A circle is inscribed in a polygon if the sides of the polygon are tangent to the circle. 
Inscribed polygon	A polygon is inscribed in a circle if the vertices of the polygon are on the circle. 
Interior angles of a polygon	The inside angle of a polygon formed by two adjacent sides
Inverse statement	The inverse of the conditional statement (“if p, then q” is the statement “if not p, then not q”)
Irregular polygon	A polygon where all sides and angles are not congruent
Isometric drawings	Drawings on isometric dot paper used to show 3-dimensional objects
Isosceles triangle	A triangle with at least two sides congruent
Line of symmetry	The line over which a figure is reflected resulting in a figure that coincides exactly with the original figure
Linear pair of angles	Two adjacent angles form a linear pair if their non-shared rays form a straight angle. 
Matrix logic	Using a matrix to solve logic problems

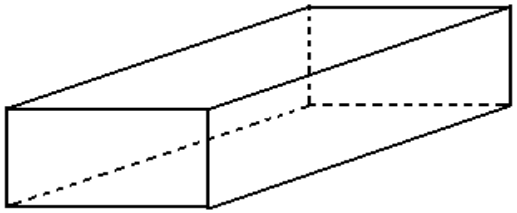
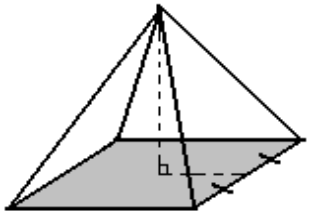
Expired June 30, 2013

Median of a triangle	A segment that has as its endpoints a vertex of the triangle and the midpoint of the opposite side 
Midpoint of a segment	The point that divides a segment into two congruent segments
Midsegment	A segment whose endpoints are the midpoints of two sides of a polygon 
Orthocenter	The orthocenter is the point of concurrency of the altitudes of a triangle. 
Orthographic drawings	An orthographic drawing is the top view, front view and right side view of a three-dimensional figure.
Parallel lines	Lines in a plane that never intersect
Parallelogram	A quadrilateral with both pairs of opposite sides parallel

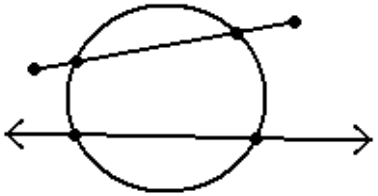
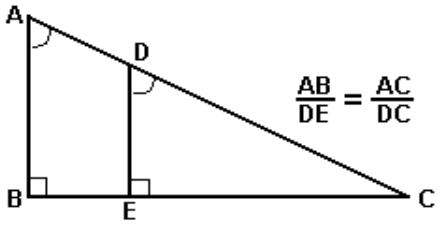
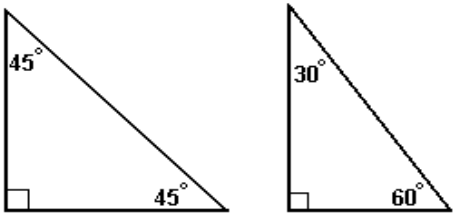
Expired June 30, 2013

Perimeter	The distance around a polygon
Perpendicular bisector	The perpendicular bisector of a segment is a line, segment or ray that is perpendicular to the segment at its midpoint. 
Perpendicular	Two lines, segments, rays, or planes that intersect to form right angles
Planes	A flat surface having no boundaries
Platonic solid	A polyhedron all of whose faces are congruent regular polygons, and where the same number of faces meet at every vertex 
Point	A specific location in space
Polygon	A closed plane figure whose sides are segments that intersect only at their endpoints with each segment intersecting exactly two other segments
Postulates	A mathematical statement that is accepted without proof

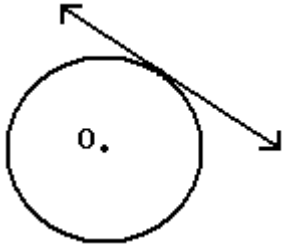
Expired June 30, 2013

Prism	A three-dimensional figure--with two congruent faces called bases--that lies in parallel planes (The other faces called lateral faces are rectangles that connect corresponding vertices of the bases.) 
Pyramid	A three-dimensional figure with one base that is a polygon (The other faces, called lateral faces, are triangles that connect the base to the vertex.) 
Quadrilateral	A four-sided polygon
Radius	A line segment having one endpoint at the center of the circle and the other endpoint on the circle
Reflections	Mirror images of a figure (Objects stay the same shape, but their positions change through a flip.)
Regular octagon	An octagon with all sides and angles congruent
Regular polygon	A polygon with all sides and angles congruent
Rotations	A transformation in which every point moves along a circular path around a fixed point called the center of rotation
Scale drawings	Pictures that show relative sizes of real objects

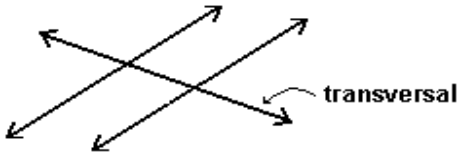
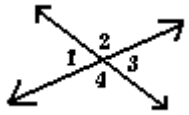
Expired June 30, 2013

Secants	A line, ray or segment that intersects a circle at two points 
Similarity	The property of being similar
Similar polygons	Two polygons are similar if corresponding angles are congruent and the lengths of corresponding sides are in proportion. 
Sine	In a right triangle, the ratio of the length of the leg opposite the angle to the length of the hypotenuse
Slope	The ratio of the vertical change to the horizontal change
Slope-intercept form	A linear equation in the form y = mx + b, where m is the slope of the graph of the equation and b is the y intercept
Special right triangles	A triangle whose angles are either 30-60-90 degrees or 45-45-90 degrees 

Expired June 30, 2013

Spheres	The set of all points in space equal distance from a given point 
Standard form of an equation	The form of a linear equation Ax + By = C where A, B, and C are real numbers and A and C are not both zero Ex. 6x + 2y = 10
Supplementary angles	Two angles whose measures add up to 180 degrees
Surface area	The area of a net for a three-dimensional figure
Tangent	In a right triangle, the ratio of the length of the leg opposite the angle to the length of the leg adjacent to the angle
Tangent to a circle	A line in the plane of the circle that intersects the circle in only one point 
Tessellate	A pattern of polygons that covers a plane without gaps or overlaps 
Theorems	A conjecture that can be proven to be true
Transformation	A change made to the size or position of a figure
Translation	A transformation that slides each point of a figure the same distance in the same direction

Expired June 30, 2013

Transversal	A line that intersects two or more other lines in the same plane at different points 
Triangle Inequality Theorem	The sum of the lengths of any two sides of a triangle is greater than the lengths of the third side.
Trigonometric ratios	The sine, cosine and tangent ratios
Venn diagram	A display that pictures unions and intersections of sets
Vertical angles	Non-adjacent, non-overlapping congruent angles formed by two intersecting lines (They share a common vertex.)  ∠1 and ∠3 are vertical angles. ∠2 and ∠4 are vertical angles.
Volume	The number of cubic units needed to fill a space

Expired June 30, 2013