

**Blind Brook School District
Math 1A: Integrated Algebra
Math Standards Curriculum Alignment
August 2008**

I. Unit: LOGIC (Duration: 5 days)

Content Performance Indicators:

- G.G.24** Determine the negation of a statement and establish its truth value
- G.G.25** Know and apply the conditions under which a compound statement (conjunction, disjunction, conditional, biconditional) is true
- G.G.26** Identify and write the inverse, converse, and contrapositive of a given conditional statement and note the logical equivalences
- G.G.27** Write a proof arguing from a given hypothesis to a given conclusion

Process Performance Indicators

- G.CN.7** Recognize and apply mathematical ideas to problem situations that develop outside of mathematics
- G.PS.2** Observe and explain patterns to formulate generalizations and conjectures
- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.7** Use mathematics to show and understand social phenomena (e.g., determine if conclusions from another person's argument have a logical foundation)
- G.CM.3** Present organized mathematical ideas with the use of appropriate standard notations, including the use of symbols and other representations when sharing an idea in verbal and written form
- G.CM.5** Communicate logical arguments clearly, showing why a result makes sense and why the reasoning is valid
- G.CM.12** Draw conclusions about mathematical ideas through decoding, comprehension, and interpretation of mathematical visuals, symbols, and technical writing
- G.CM.8** Reflect on strategies of others in relation to one's own strategy
- G.CM.9** Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10** Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures
- G.CM.11** Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams

Vocabulary

biconditional
compound statement
conclusion
conditional statement
conjecture
conjunction
contradiction
contrapositive of a statement
converse of a statement
counterexample
deductive proof
deductive proof
deductive reasoning
definition
disjunction
generalization
geometry
hypothesis
indirect proof
inductive reasoning
intersection of sets
inverse of a statement
justify
logical equivalence
negation
proof
proof by contradiction
real numbers
reason
set
truth value
union of sets
valid argument

II. Unit: INTRODUCTION TO EUCLIDEAN GEOMETRY (Duration: 4 days)

Review points, lines, planes, axioms, postulates, theorems (see 7th, 8th and Algebra curriculum)

Content Performance Indicators

G.G.35 Determine if two lines cut by a transversal are parallel, based on the measure of given pairs of angles formed by the transversal and the lines

Process Performance Indicators

G.CN.4 Understand how concepts, procedures, and mathematical results in one area of mathematics can be used to solve problems in other areas of mathematics

G.R.1 Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts

G.CM.1 Communicate verbally and in writing a correct, complete, coherent, and clear design (outline) and explanation for the steps used in solving a problem

G.CM.8 Reflect on strategies of others in relation to one's own strategy

G.CM.9 Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others

G.CM.10 Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures

G.CM.11 Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams

Vocabulary

acute angle

acute triangle

adjacent angles

algorithm

alternate interior angles

altitude

angle

angle bisector

angle measure

apply

axiom

betweenness

bisector

collinear points

complementary angles

concurrent lines

coplanar

corresponding angles

definition

definition

diameter
discover
endpoint
equiangular
equidistant
equilateral polygon
equilateral triangle
Euclidean geometry
Euclidean Parallel Postulate
geometry
intersecting lines
investigate
isosceles trapezoid
isosceles triangle
kite
length
line
line segment
linear pair
measure of an angle
non-collinear
non-coplanar
non-Euclidean geometry
obtuse angle
obtuse triangle
octagon
opposite rays
parallel line segments
parallel lines
parallel postulate(s)
parallelogram
pentagon
perpendicular lines
perpendicular planes
plane
point
polygon
ray
right angle
scalene triangle
segment
skew lines
square
supplementary angles
theorem
transversal

trapezoid
triangle
two-dimensional space
undefined terms
vertex
vertical angles
vertical line

III. Unit: TWO AND THREE DIMENSIONAL GEOMETRY (Duration: 15 days)

Content Performance Indicators

- G.G.1** Know and apply that if a line is perpendicular to each of two intersecting lines at their point of intersection, then the line is perpendicular to the plane determined by them
- G.G.2** Know and apply that through a given point there passes one and only one plane perpendicular to a given line
- G.G.3** Know and apply that through a given point there passes one and only one line perpendicular to a given plane
- G.G.4** Know and apply that two lines perpendicular to the same plane are coplanar
- G.G.5** Know and apply that two planes are perpendicular to each other if and only if one plane contains a line perpendicular to the second plane
- G.G.6** Know and apply that if a line is perpendicular to a plane, then any line perpendicular to the given line at its point of intersection with the given plane is in the given plane
- G.G.7** Know and apply that if a line is perpendicular to a plane, then every plane containing the line is perpendicular to the given plane
- G.G.8** Know and apply that if a plane intersects two parallel planes, then the intersection is two parallel lines
- G.G.9** Know and apply that if two planes are perpendicular to the same line, they are parallel

Process Performance Indicators

- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.3** Use representation as a tool for exploring and understanding mathematical ideas
- G.R.5** Investigate relationships between different representations and their impact on a given problem
- G.R.6** Use mathematics to show and understand physical phenomena (e.g., determine the number of gallons of water in a fish tank)
- G.CM.8** Reflect on strategies of others in relation to one's own strategy
- G.CM.9** Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10** Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures
- G.CM.11** Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams

Vocabulary

dynamic geometry software

Euclidean Parallel Postulate

great circle

hemisphere

spatial relationships

three dimensional space

topology

two dimensional space

vector

IV. Unit: PROPERTIES OF SOLID GEOMETRY (Duration: 10 days)

Content Performance Indicators

- G.G.10** Know and apply that the lateral edges of a prism are congruent and parallel
- G.G.11** Know and apply that two prisms have equal volumes if their bases have equal areas and their altitudes are equal
- G.G.12** Know and apply that the volume of a prism is the product of the area of the base and the altitude
- G.G.13** Apply the properties of a regular pyramid, including:
- lateral edges are congruent
 - lateral faces are congruent isosceles triangles
 - volume of a pyramid equals one-third the product of the area of the base and the altitude
- G.G.14** Apply the properties of a cylinder, including:
- bases are congruent
 - volume equals the product of the area of the base and the altitude
 - lateral area of a right circular cylinder equals the product of an altitude and the circumference of the base
- G.G.15** Apply the properties of a right circular cone, including:
- lateral area equals one-half the product of the slant height and the circumference of its base
 - volume is one-third the product of the area of its base and its altitude
- G.G.16** Apply the properties of a sphere, including:
- the intersection of a plane and a sphere is a circle,
 - a great circle is the largest circle that can be drawn on a sphere
 - two planes equidistant from the center of the sphere and intersecting the sphere do so in congruent circles
- surface area is $4\pi r^2$ volume is $\frac{4}{3}\pi r^3$

Process Performance Indicators

- G.CN.5** Understand how quantitative models connect to various physical models and representations
- G.PS.7** Work in collaboration with others to propose, critique, evaluate, and value alternative approaches to problem solving
- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.2** Recognize, compare, and use an array of representational forms
- G.R.6** Use mathematics to show and understand physical phenomena (e.g., determine the number of gallons of water in a fish tank)
- G.CM.2** Use mathematical representations to communicate with appropriate accuracy, including numerical tables, formulas, functions, equations, charts, graphs, and diagrams
- G.CM.6** Support or reject arguments or questions raised by others about the correctness of mathematical work
- G.CM.7** Read and listen for logical understanding of mathematical thinking shared by other students
- G.CM.8** Reflect on strategies of others in relation to one's own strategy

- G.CM.9** Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10** Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures
- G.CM.11** Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams

Vocabulary

cone
crosssection
cube
cylinder
dynamic geometry software
explain
justify
lateral area of a prism
lateral edge
lateral face
lateral surface
orthogonal
parallelepiped
prism
pyramid
rectangular solid
sphere
surface area
volume

V. Unit: TRIANGLES AND THEIR PROPERTIES (Duration: 25 days)

Exploratory software – Geometer’s Sketchpad, Cabri Jr. etc.

Content Performance Indicators

- G.G.30** Investigate, justify, and apply theorems about the sum of the measures of the angles of a triangle
- G.G.31** Investigate, justify, and apply the isosceles triangle theorem and its converse
- G.G.32** Investigate, justify, and apply theorems about geometric inequalities, using the exterior angle theorem
- G.G.33** Investigate, justify, and apply the triangle inequality theorem
- G.G.34** Determine either the longest side of a triangle given the three angle measures or the largest angle given the lengths of three sides of a triangle
- G.G.42** Investigate, justify, and apply theorems about geometric relationships, based on the properties of the line segment joining the midpoints of two sides of the triangle
- G.G.43** Investigate, justify, and apply theorems about the centroid of a triangle, dividing each median into segments whose lengths are in the ratio 2:1
- G.G.44** Establish similarity of triangles, using the following theorems: AA
- G.G.45** Investigate, justify, and apply theorems about similar triangles
- G.G.46** Investigate, justify, and apply theorems about proportional relationships among the segments of the sides of the triangle, given one or more lines parallel to one side of a triangle and intersecting the other two sides of the triangle
- G.G.47 I** Investigate, justify, and apply theorems about mean proportionality:
- the altitude to the hypotenuse of a right triangle is the mean proportional between the two segments along the hypotenuse
 - the altitude to the hypotenuse of a right triangle divides the hypotenuse so that either leg of the right triangle is the mean proportional between the hypotenuse and segment of the hypotenuse adjacent to that leg
- G.G.48** Investigate, justify, and apply the Pythagorean Theorem and its converse

Process Performance Indicators

- G.PS.1** Use a variety of problem solving strategies to understand new mathematical content
- G.PS.6** Use a variety of strategies to extend solution methods to other problems
- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.3** Use representation as a tool for exploring and understanding mathematical ideas
- G.CM.8** Reflect on strategies of others in relation to one’s own strategy
- G.CM.9** Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10** Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students’ conjectures
- G.CM.11** Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams

Vocabulary

base

bisector

center of gravity

centroid

circumcenter

definition

discover

explore

exterior

exterior angle

foot of an altitude

generalization

geometric mean

golden ratio

golden rectangle

Heron's formula

hypotenuse

hypotenuse and leg triangle congruence

justify

legs of a right triangle

mean proportional

median of a triangle

midsegment

orthocenter

perimeter

Pythagorean Theorem

remote interior angles

right triangle

slant height

triangle inequality

trigonometry of the right triangle

VI: Unit: CONGRUENCE

Duration: 20 days

Content Performance Indicators

- G.G.28** Determine the congruence of two triangles by using one of the five congruence techniques (SSS, SAS, ASA, AAS, HL), given sufficient information about the sides and/or angles of two congruent triangles
- G.G.29** Identify corresponding parts of congruent triangles

Process Performance Indicators

- G.R.8** Use mathematics to show and understand mathematical phenomena (e.g., use investigation, discovery, conjecture, reasoning, arguments, justification and proofs to validate that the two base angles of an isosceles triangle are congruent)
- G.RP.3** Investigate and evaluate conjectures in mathematical terms, using mathematical strategies to reach a conclusion
- G.RP.4** Provide correct mathematical arguments in response to other students' conjectures, reasoning, and arguments
- G.RP.6** Evaluate written arguments for validity
- G.RP.8** Devise ways to verify results or use counterexamples to refute incorrect statements
- G.RP.9** Apply inductive reasoning in making and supporting mathematical conjectures
- G.CN.2** Understand the corresponding procedures for similar problems or mathematical concepts
- G.CN.8** Develop an appreciation for the historical development of mathematics
- G.PS.4** Construct various types of reasoning, arguments, justifications and methods of proof for problems
- G.PS.8** Determine information required to solve a problem, choose methods for obtaining the information, and define parameters for acceptable solutions
- G.PS.9** Interpret solutions within the given constraints of a problem

Vocabulary

AAS triangle congruence
AAS triangle congruence
additive property of equality
analytical proof
angle addition postulate
apply
ASA triangle congruence
bisector
congruence
corresponding parts
corresponding sides
deductive reasoning
discover
equivalence relation
explain
explore

hypotenuse and leg triangle congruence
hypothesis
indirect proof
inductive reasoning
justify
paragraph proof
parallel postulate(s)
postulate
proof
proof by contradiction
reason
reflexive property of equality
SAS triangle congruence
SSS triangle congruence
substitution property
substitution property
subtraction property of equality
symmetric property of equality
theorem
transitive property of equality
two-column proof

VII Unit: SIMILARITY (Duration: 10 days)

Content Performance Indicators

G.G.44 Establish similarity of triangles, using the following theorems: SAS, and SSS

Process Performance Indicators

- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.4** Select appropriate representations to solve problem situations
- G.CM.1** Communicate verbally and in writing a correct, complete, coherent, and clear design (outline) and explanation for the steps used in solving a problem
- G.CM.8** Reflect on strategies of others in relation to one's own strategy
- G.CM.9** Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10** Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures
- G.CM.11** Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams

Vocabulary

AA triangle similarity
AAA triangle similarity
constant of proportionality
product property of proportions
proportional
ratio
SAS Similarity Theorem
similar polygons
similar triangles

VIII: Unit: POLYGONS (Duration: 10 days)

Content Performance Indicators

- G.G.36 Investigate, justify, and apply theorems about the sum of the measures of the interior and exterior angles of polygons
- G.G.37 Investigate, justify, and apply theorems about each interior and exterior angle measure of regular polygons
- G.G.38 Investigate, justify, and apply theorems about parallelograms involving their angles, sides, and diagonals
- G.G.39 Investigate, justify, and apply theorems about special parallelograms (rectangles, rhombuses, squares) involving their angles, sides, and diagonals
- G.G.40 Investigate, justify, and apply theorems about trapezoids (including isosceles trapezoids) involving their angles, sides, medians, and diagonals
- G.G.41 Justify that some quadrilaterals are parallelograms, rhombuses, rectangles, squares, or trapezoids

Process Performance Indicators

- G.R.1 Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.3 Use representation as a tool for exploring and understanding mathematical ideas
- G.R.4 Select appropriate representations to solve problem situations
- G.CM.8 Reflect on strategies of others in relation to one's own strategy
- G.CM.9 Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10 Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures
- G.CM.11 Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams

Vocabulary

apothem
center of a regular polygon
central angle of a regular polygon
circumcircle (about a polygon)
concave polygon
convex polygon
diagonals
dihedral angle
dodecahedron
face of a polyhedron
hexagon
icosahedron
incenter of a polygon
inscribed circle
interior
legs of an isosceles trapezoid

median of a trapezoid
n-gon
octahedron
polyhedron
quadrilateral
rectangle
regular polygon
rhombus
simple quadrilateral
tetrahedron

IX: Unit: COORDINATE GEOMETRY (Duration: 13 days)

Content Performance Indicators

- G.G.62** Find the slope of a perpendicular line, given the equation of a line
- G.G.63** Determine whether two lines are parallel, perpendicular, or neither, given their equations
- G.G.64** Find the equation of a line, given a point on the line and the equation of a line perpendicular to the given line
- G.G.65** Find the equation of a line, given a point on the line and the equation of a line parallel to the desired line
- G.G.66** Find the midpoint of a line segment, given its endpoints
- G.G.67** Find the length of a line segment, given its endpoints
- G.G.68** Find the equation of a line that is the perpendicular bisector of a line segment, given the endpoints of the line segment
- G.G.69** Investigate, justify, and apply the properties of triangles and quadrilaterals in the coordinate plane, using the distance, midpoint, and slope formulas

Process Performance Indicators

- G.RP.1** Recognize that mathematical ideas can be supported by a variety of strategies
- G.RP.2** Recognize and verify, where appropriate, geometric relationships of perpendicularity, parallelism, congruence, and similarity, using algebraic strategies
- G.RP.5** Present correct mathematical arguments in a variety of forms
- G.RP.7** Construct a proof using a variety of methods (e.g., deductive, analytic, transformational)
- G.CN.3** Model situations mathematically, using representations to draw conclusions and formulate new situations
- G.PS.3** Use multiple representations to represent and explain problem situations (e.g., spatial, geometric, verbal, numeric, algebraic, and graphical representations)
- G.PS.10** Evaluate the relative efficiency of different representations and solution methods of a problem
- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.2** Recognize, compare, and use an array of representational forms
- G.R.3** Use representation as a tool for exploring and understanding mathematical ideas
- G.R.4** Select appropriate representations to solve problem situations
- G.R.8** Use mathematics to show and understand mathematical phenomena (e.g., use investigation, discovery, conjecture, reasoning, arguments, justification and proofs to validate that the two base angles of an isosceles triangle are congruent)
- G.CM.4** Explain relationships among different representations of a problem
- G.CM.8** Reflect on strategies of others in relation to one's own strategy
- G.CM.9** Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10** Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures

G.CM.11 Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams

Vocabulary

abscissa
analytical geometry
analytical proof
axis of symmetry
Cartesian coordinates
Cartesian plane
center-radius equation of circle
coordinate
coordinate geometry
coordinate plane
distance
distance between a point and a line
distance between two points
function
graphical representation
inclination
intercepts
midpoint
origin
point slope equation of a line
quadrant
rectangular coordinates
slope
slope - intercept equation of a line
three-dimensional space
two-dimensional space
vector
x-axis
x-intercept
y - intercept
y-axis
y-intercept
z-axis

X: Unit: CONSTRUCTIONS AND LOCI (Duration: 12 days)

Content Performance Indicators

- G.G.17** Construct a bisector of a given angle, using a straightedge and compass, and justify the construction
- G.G.18** Construct the perpendicular bisector of a given segment, using a straightedge and compass, and justify the construction
- G.G.19** Construct lines parallel (or perpendicular) to a given line through a given point, using a straightedge and compass, and justify the construction
- G.G.20** Construct an equilateral triangle, using a straightedge and compass, and justify the construction
- G.G.21** Investigate and apply the concurrence of medians, altitudes, angle bisectors, and perpendicular bisectors of triangles
- G.G.22** Solve problems using compound loci
- G.G.23** Graph and solve compound loci in the coordinate plane

Process Performance Indicators

- G.CN.6** Recognize and apply mathematics to situations in the outside world
- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.2** Recognize, compare, and use an array of representational forms

Vocabulary

angle bisector
bisector
center of a circle
center of a regular polygon
center of gravity
circle
circumcircle (about a polygon)
compass
compound locus
concentric circles
construct
distance between two parallel lines
dynamic geometry software
ellipse
hyperbola
locus of points
parabola
perpendicular bisector
perpendicular bisector
perpendicular bisector concurrence
perpendicular lines
point of concurrency
straightedge

XI: Unit: EQUATIONS OF LINEAR, QUADRATIC AND CIRCLES
(Duration:15 days)

Content Performance Indicators

- G.G.70** Solve systems of equations involving one linear equation and one quadratic equation graphically
- G.G.71** Write the equation of a circle, given its center and radius or given the endpoints of a diameter
- G.G.72** Write the equation of a circle, given its graph *Note: The center is an ordered pair of integers and the radius is an integer.*
- G.G.73** Find the center and radius of a circle, given the equation of the circle in center-radius form
- G.G.74** Graph circles of the form $(x-h)^2 + (j-k)^2 = r^2$ (note to self: change j to y)

Process Performance Indicators

- G.CN.1** Understand and make connections among multiple representations of the same mathematical idea
- G.CN.3** Model situations mathematically, using representations to draw conclusions and formulate situations.
- G.PS.5** Choose an effective approach to solve a problem from a variety of strategies (numeric, graphic, algebraic)
- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.CM.8** Reflect on strategies of others in relation to one's own strategy
- G.CM.9** Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10** Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures
- G.CM.11** Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and geometric diagrams

Vocabulary

absolute value
algebraic representation
axis of symmetry
center of a circle
conic sections
constraints
parabola
parameters
perpendicular bisector
quadratic equation
quadratic formula

XII: Unit: CIRCLES (Duration: 14 days)

Content Performance Indicators

- G.G.49** Investigate, justify, and apply theorems regarding chords of a circle:
- perpendicular bisectors of chords
 - the relative lengths of chords as compared to their distance from the center of the circle
- G.G.50** Investigate, justify, and apply theorems about tangent lines to a circle:
- a perpendicular to the tangent at the point of tangency
 - two tangents to a circle from the same external point
 - common tangents of two non-intersecting or tangent circles
- G.G.51** Investigate, justify, and apply theorems about the arcs determined by the rays of angles formed by two lines intersecting a circle when the vertex is:
- inside the circle (two chords)
 - on the circle (tangent and chord)
 - outside the circle (two tangents, two secants, or tangent and secant)
- G.G.52** Investigate, justify, and apply theorems about arcs of a circle cut by two parallel lines
- G.G.53** Investigate, justify, and apply theorems regarding segments intersected by a circle:
- along two tangents from the same external point
 - along two secants from the same external point
 - along a tangent and a secant from the same external point
 - along two intersecting chords of a given circle

Process Performance Indicators

- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.4** Select appropriate representations to solve problem situations
- G.R.5** Investigate relationships between different representations and their impact on a given problem
- G.CM.8** Reflect on strategies of others in relation to one's own strategy
- G.CM.9** Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10** Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures
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Vocabulary

arc
arc measure
area
central angle
chord
circle
circumference

common tangents
diameter
ellipse
external secant segment
inscribed angle
intercepted arc
major arc
measure of an arc
minor arc
pi
point of tangency
radius
secant
segment of a circle
semicircle
tangent segment
tangent to a circle

XIII: Unit: TRANSFORMATIONS (Duration: 12 days)

Content Performance Indicators

- G.G.54** Define, investigate, justify, and apply isometries in the plane (rotations, reflections, translations, glide reflections) *Note: Use proper function notation.*
- G.G.55** Investigate, justify, and apply the properties that remain invariant under translations, rotations, reflections, and glide reflections
- G.G.56** Identify specific isometries by observing orientation, numbers of invariant points, and/or parallelism
- G.G.57** Justify geometric relationships (perpendicularity, parallelism, congruence) using transformational techniques (translations, rotations, reflections)
- G.G.58** Define, investigate, justify, and apply similarities (dilations and the composition of dilations and isometries)
- G.G.59** Investigate, justify, and apply the properties that remain invariant under similarities
- G.G.60** Identify specific similarities by observing orientation, numbers of invariant points, and/or parallelism
- G.G.61** Investigate, justify, and apply the analytical representations for translations, rotations about the origin of 90° and 180° , reflections over the lines $x = 0$, $y = 0$, and $y = x$, and dilations centered at the origin

Process Performance Indicators

- G.R.1** Use physical objects, diagrams, charts, tables, graphs, symbols, equations, and objects created using technology as representations of mathematical concepts
- G.R.2** Recognize, compare, and use an array of representational forms
- G.CM.8** Reflect on strategies of others in relation to one's own strategy
- G.CM.9** Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others
- G.CM.10** Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures
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Vocabulary

axis of symmetry
center of a dilation
center of a rotation
clockwise (orientation)
composition
constant of proportionality
contraction
counterclockwise (orientation)
dilation
direct transformation
domain
dynamic geometry software

fixed point
function
function notation for transformations
glide reflection
group
half-turn
identity
image
inverse of a transformation
isometry
mapping (function)
opposite transformation
orientation
preimage
reflection
rotation
rotational symmetry
symmetry
tessellation
transformation
transformational geometry
transformational proof
translation