Unit 1: Segments, length and area

Date	Lesson title	Topics	Extension topics
9/8	1.1 Segment length, vocabulary	Length, number lines; points, segments; measuring centimeters, inches, feet	Absolute value
9/9	1.2 Segment addition	Postulate, collinear; algebraic conventions, prior knowledge	Algebra with fractional coefficients
9/12	1.3 Geometric objects	Lines, rays, planes, coplanar	Efficient solutions to algebra equations
9/13	1.4 Midpoint and bisector	Congruence, hash marks; solve equations with variables on both sides	Trisection
9/15	1.5 Equilateral $\triangle$, isosceles $\triangle$, perimeter	Special triangles and quadrilaterals; calculate perimeter	Find endpoint given midpoint
9/16	1.6 Review	Roundtable of peers: Terms, perimeter, modeling, algebra solving	
9/19	1.7 Unit conversion	Inches $\rightleftarrows$ feet, inches $\rightleftarrows$ centimeters, formula sheet use	
9/19	1.7 Exit Note Quiz: Length and perimeter	Use algebra to solve simple distance problems, vocabulary and notation	Absolute value, solve for endpoint, algebra
9/20	1.8 Area	Rectangle, triangle, parallelogram area; units, solving for missing dimension	Scientific notation
9/22	1.9 Rounding, circles	Area of a circle, circumference, π, decimals, compound figures	Sig figs
9/23	1.10 Precision	Percent error formula	Confidence intervals
9/28	1.11 Review	Roundtable peers: Length, area and perimeter, % error, solving algebra	
9/30	1.12 Test: Length and area	Using algebra to solve, conventions, precision and rounding	Confidence intervals, absolute value, scientific notation

12 Instructional days (1-12 / 159)

Application contexts:

- Classroom diagram, desk layout and dimensions (proctoring instructions reference)
- Maps: NYC streets, US states, historic treks (Lewis and Clark, Sherman, Ponz de Leon)
- Ordinal number lines: Supreme Court justices
- Curved number lines: clocks, parlimentary diagrams

Unit 2: Angles

Date	Lesson title	Topics	Extension topics
10/3	2.1 Angle measures	Terminology, notation, 90°, 180°, 360°, measuring with protractor	Algebra with absolute values review
10/4	2.2 Angle addition, pairs	Adjacent, linear, complementary, supplementary	Clock problems
10/7	2.3 Vertical angles	Opposite angles	Proof vertical $\angle$s $\cong$
10/11	2.4 Angle bisector	Congruence, hash marks; solving equations	Bearings
10/12	2.5 Equilateral and isosceles $\triangle$s	Special triangles, isosceles base theorem	Radian units
10/13	2.6 Review	Roundtable: Terms, protractor use, algebraic modeling, triangle situations	
10/14	2.7 Test: Angles	Using algebra to solve, conventions, precision and rounding	Bearings, radians

7 Instructional days (13-19 / 159)

Unit 3: Transversals

Date	Lesson title	Topics	Extension topics
10/17	3.1 Parallel lines	Identifying transversal angles, parallel and perpendicular definitions	Ratios
10/18	3.2 Finding angle measures	Modeling with algebra, solve	Ratio partition
10/20	3.3 Triangle sum	Derivation, auxilary lines, aper folding model	Non-Euclidean geometries
10/21	3.4 Parallelograms	Definitions, opposite sides $\cong$	Deltamath ramp-up
10/24	3.5 External angles	$\triangle$ external angles	
10/25	3.6 Transversal situations	Multiple steps: angle pairs, isosceles $\triangle$s	Polygon internal angles
10/27	3.8 Review	Roundtable: Transversal naming conventions, solving for angles, parallelograms, situations	
10/28	3.9 Test: Transversals	Parallel line situations, implications for polygons	

9 Instructional days (20-28 / 159)

Algebra review and prior learning assessment, tools

Unit 4: Volume and polyhedra

Date	Lesson title	Topics	Extension topics
10/31	4.1 Nets of prisms	Definitions, folding	
11/1	4.2 Surface area	Rectangular prisms	Wooden cube models
11/3	4.3 Volume	Prisms, cubes, units	
11/4	4.4 Solve for a side	Algebra application, rectangular prisms, solve for area of base	
11/7	4.5 Exponent review	Squaring, cubic, radicals	Exponent rules
11/10	4.6 Spheres, cones, pyramids	Volume formulas, solve for parameter	Simplifying radicals
11/14	4.7 2-D Density	Population density, cost calculations	
11/15	4.8 Weight	Density calculations of a volume, multi-step problems	
11/17	4.9 Review	Roundtable:	
11/18	4.10 Test: Volume and polyhedra		

10 Instructional days (29-38 / 159)

Unit 5: Pythagorean theorem

Date	Lesson title	Topics	Extension topics
11/21	5.1 Geometric proof	Diagram for visual proof, history (list of proofs)	
11/22	5.2 Algebraic form	$a^2 + b^2 = c^2$, triples	
11/28	5.3 Coordinate plane	Distance formula, standard position	3-D formula
11/29	5.4 Solve for a leg	Square roots	Higher orders, simplify radicals
12/1	5.5 Special triangles	Equilateral and isosceles right $\triangle$s	
12/2	5.6 Additional proofs	Writing project	
12/5	5.7 Review	Roundtable	
12/6	5.8 Test	Triples, distance formula, solve for a leg, special triangles	

8 Instructional days (39-46 / 159)

Unit 6: Analytic geometry

Date	Lesson title	Topics	Extension topics
12/8	6.1 Midpoint formula	Coordinate plane, midpoint as average	3-D midpoint
12/9	6.2 Linear equations	Slope-intercept form, graphing, gradient	
12/12	6.3 Standard form	Algebraic conversion in both directions	Domain and range, open and closed endpoints, inequality and interval notation
12/13	6.4 Slopes: $\parallel$, $\perp$	Negative reciprocals, geometric interpretation as 90° rotation	Point-slope form
12/15	6.5 $\tan\theta$	Interpretation of slope	Radian use
12/16	6.6 Linear functions	$f(x)$ notation, vertical and horizontal	
1/3	6.7 Review		
1/4	6.8 Test	Graphing, rate of change, algebraic conversion, parallel and perpendicular slopes	Line through a point, point-slope

8 Instructional days (47-54 / 159)

Unit 7: Project

Date	Lesson title	Topics	Extension topics
1/5	7.1 Pick a topic		
1/6	7.2 Outline, Intro		
1/7	7.3 Diagrams		
1/8	7.4 Text body		
1/9	7.5 Diagrams		Mock Regents (YTD)
1/12	7.6 Text body	Early finishers: compass, flower of life design	
1/13	7.7 Peer review		
1/14	7.8 Revision		
1/15	7.9 Presentations		
1/16	7.10 Presentations		

10 Instructional days (55-64 / 159)

Unit 8: Congruence transformations

Date	Lesson title	Topics	Extension topics
1/3	8.1 Translation	Rigid motion, isometry, notation, construct equilateral $\triangle$	Vectors
1/4	8.2 Reflection	Orientation, invariance	Construct $\perp$ bisector
1/5	8.3 Rotation	Center, direction, magnitude in degrees	Centered away from the origin
1/6	8.4 Triangle correspondences	SSS	Proving congruence
1/9	8.5 Triangle congruencies	ASA, SAS	Reflexive property
1/10	8.6 "Onto" mappings	Rotational symmetry, regular polygons	
1/11	8.7 Symmetry	Bilateral symmetry, compositions	Proof of isosceles base theorem
1/12	8.8 Review		
1/13	8.9 Test	Translation, reflection, rotation, $\triangle$ congruencies	

9 Instructional days (65-73 / 159)

Unit 9: Dilation

Date	Lesson title	Topics	Extension topics
1/17	9.1 Dilation	Triangle graphing, angle correspondence	
1/18	9.2 Scale factor		Dilations not centered at the origin
1/19	9.3 Overlapping triangles		
1/20	9.4 Compositions		
1/23	9.5 Scale maps		
1/31	9.6 Project	Cuba and Taiwan comparision	
2/1	9.7 Presentations		
2/2	9.8 Review		
2/3	9.9 Test		

9 Instructional days (74-82 / 159)

Unit 10: Similarity and proportion

Date	Lesson title	Topics	Extension topics
2/6	10.1 Midline, median		Centroid, median partition
2/7	10.2 Similarity situations		
2/8	10.3 Overlapping $\triangle$ composition	Reflection and dilation, overlapping $\triangle$	
2/9	10.4 Area and volume scaling		
2/10	10.5 Algebraic modeling		$\triangle$s in circles, angles
2/13	10.6 Applications of scale		Chord lengths
2/14	10.7 Project		Secant triangle angles
2/15	10.8 Presentations		Secant lengths
2/16	10.9 Review		
2/17	10.10 Test		

10 Instructional days (83-92 / 159)

Unit 11: Circle angles, sectors, arcs

Date	Lesson title	Topics	Extension topics
2/27	11.1 Arc length	Circumference, central angle, rotation, radius, diameter	Radians
2/28	11.2 Sector area	Exact and decimal calculations	Circle equations
3/1	11.3 Inscribed polygons	Regular polygon area	Segment area
3/2	11.4 Inscribed angles	Chords, inscribed angle theorem	Completing the square
3/3	11.5 Secants, tangents	Tangent $\perp$ radius, circumscribed	
3/6	11.6 Pie charts	Data presentation	Incenter and circumcenter
3/7	11.7 Project		
3/8	11.8 Presentations	Completing the square (calculator)	
3/9	11.9 Review		
3/10	11.10 Test		

10 Instructional days (93-102 / 159)

Unit 12: Trigonometry

Date	Lesson title	Topics	
3/13	12.1 Tangent	Slope, angle of rotation, graphing, Pythagorean triples	
3/14	12.2 Tan inverse		Radians
3/15	12.3 Tangent applications	Angle of elevation, declination	3-D situations
3/16	12.4 Sine and cosine	SOHCAHTOA	
3/17	12.5 Inverse functions		
3/20	12.6 Special triangles		Complementary angle theorem
3/21	12.7 Project		
3/22	12.8 Presentations		
3/23	12.9 Review		
3/24	12.10 Test		

10 Instructional days (103-112 / 159)

Unit 13: Quadrilaterals

Date	Lesson title	Topics	
3/27	13.1 Parallelograms	Sides, angles properties	
3/28	13.2 Diagonals	Congruent triangle implications, bisectors	
3/29	13.3 Rectangles and squares	Congruent diagonals	
3/30	13.4 Rhombus	Perpendicular diagonals, perimeter	
3/31	13.5 Kites	Perimeter	
4/3	13.6 Quadrilateral circle inscription	Angle properties	
4/4	13.7 Review		
4/5	13.8 Test		

8 Instructional days (113-120 / 159)

Unit 14: Function transformations

Date	Lesson title	Topics	
4/17	14.1 Translations	Graphing	
4/28	14.5 Test	Linear, polynomial, reciprocal, exponential, periodic	

9 Instructional days (113-120 / 159)

Unit 15: IB Trigonometry

Date	Lesson title	Topics	
5/1	15.1 Sine $\triangle$ area formula		
5/2	15.2 Sine rule		
5/3	15.3 Cosine rule		
5/4	15.4 Review	Roundtable	
5/5	15.5 Test		
5/8	15.6 IB Prior learning assessment		

[6] Instructional days (113-120 / 159)

Project ideas

- Rate of change, Interpretations of slope
- Numberlines
  - Dates: 1492, 1776, 1969
  - Silk Road distance by latitude, Gibralter to Tokyo
  - Timelines of civilizations
  - Supreme Court justices
  - Curved clock face
  - Curved parlimentary party split

Tech skills progression

1. Graph paper, graphing, scale drawing
2. Origami
3. 3-D paper or stick models (glue guns)
4. Geogebra drawing figures, angle measures
5. GraspableMath algebraic notation
6. Map reading, latitude and longitude, distance
7. Desmos analytic geometry, functions