

Knox County Prioritized Mathematics Curriculum 3108 Geometry

2006-2007

Key

C-Compact - objectives that have been previously taught

A-Assessed – objectives assessed by Knox County or the state

I-Important - objectives providing enrichment skills or support to subsequent mathematics courses (optional)

*** These objectives and “aligned” chapters are arranged in the order of suggestive sequence for teaching.**

**Knox County Prioritized Mathematics Curriculum
3108 Geometry**

Chapter 1: Tools of Geometry

<p>Vocabulary</p> <p>Page 61 of textbook</p>	<p>Writing Prompts</p> <ul style="list-style-type: none"> • Explain how you can use a conjecture to help solve a problem. • Explain how a postulate and a conjecture are alike and how they are different. • How are parallel and skew lines alike? Different?
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
• A	<ul style="list-style-type: none"> • 1.1.A Order a set of rational and irrational numbers. 	<ul style="list-style-type: none"> • Use inductive reasoning to make conjectures. 	• 1.1	• page 4 - 9
• A	<ul style="list-style-type: none"> • 2.1.A Extend or find missing elements in a geometric pattern. 	<ul style="list-style-type: none"> • Understand basic terms of geometry. • Understand basic postulates of geometry. 	• 1.2	• page 10 - 16
• A	<ul style="list-style-type: none"> • 2.1.A Extend or find missing elements in a geometric pattern. 	<ul style="list-style-type: none"> • Identify segments and rays. • Recognize parallel lines. 	• 1.3	• page 17 - 23
• A	<ul style="list-style-type: none"> • 4.2 Apply measurement concepts and relationships in algebraic and geometric problem-solving situations. • 1.3 Demonstrate an understanding of absolute value. 	<ul style="list-style-type: none"> • Find the lengths of segments. • Find the measures of angles. 	• 1.4	• page 25 - 33
• A	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Use a compass and a straightedge to construct congruent segments and congruent angles. • Use a compass and a straightedge to bisect segments and angles. 	• 1.5	• page 34 - 40
• C	<ul style="list-style-type: none"> • 2.1.E Determine the distance, midpoint, or slope when given the coordinates of two points. 	<ul style="list-style-type: none"> • Find the distance between two points in the coordinate plane. • Find the coordinates of the midpoint of a segment in the coordinate plane. 	• 1.6	• page 43 - 49
• A	<ul style="list-style-type: none"> • 4.1.A Determine the perimeter or area of a triangle or rectangle when the dimensions are first-degree binomials. 	<ul style="list-style-type: none"> • Find perimeters of rectangles and squares, and find circumferences of circles. • Find areas of rectangles, squares, and circles. 	• 1.7	• page 51 - 58

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Chapter 2: Reasoning and Proof

<p>Vocabulary</p> <p>Page 105 of textbook</p>	<p>Writing Prompts</p> <ul style="list-style-type: none"> • When do you use a property of equality? • When do you use a property of congruence? • What angles are used frequently in house and building design?
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.4 Use inductive reasoning to make conjectures and solve problems.	<ul style="list-style-type: none"> • Recognize conditional statements. • Write converses of conditional statements. 	2.1	page 68 - 74
A	3.4 Use inductive reasoning to make conjectures and solve problems.	<ul style="list-style-type: none"> • Write biconditionals. • Recognize good definitions. 	2.2	page 75 - 81
I	3.3 Justify conclusions and solve problems using deductive reasoning.	<ul style="list-style-type: none"> • Use the Law of Detachment. • Use the Law of Syllogism. 	2.3	page 82 - 88
A	2.3 Solve problems connecting geometry with number theory, probability and statistics, and measurement and estimation using algebraic thinking and symbolism.	<ul style="list-style-type: none"> • Connect reasoning in algebra and geometry. 	2.4	page 89 - 94
A	3.2 Apply geometric properties of solids, polygons, and circles to solve real-world problems.	<ul style="list-style-type: none"> • Identify angle pairs. • Prove and apply theorems about angles. 	2.5	page 96 - 103

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Chapter 3: Parallel and Perpendicular Lines

Vocabulary Page 173 of textbook	Writing Prompts <ul style="list-style-type: none"> • Summarize what you know about angles when the transversal cuts parallel lines. • Write reflexive, symmetric, and transitive statements for “is parallel to”. • Is every equilateral triangle isosceles? Is every isosceles triangle equilateral? Explain.
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.10 Demonstrate understanding of geometric properties of congruence, similarity, perpendicularity, and parallelism.	<ul style="list-style-type: none"> • Identify angles formed by two lines and a transversal. • Prove and use properties of parallel lines. 	3.1	page 115 - 121
A	3.12 Use logic and proof to establish the validity of conjectures and theorems.	<ul style="list-style-type: none"> • Use a transversal in proving lines parallel. • Relate parallel and perpendicular lines. 	3.2	page 122 - 129
A	3.12 Use logic and proof to establish the validity of conjectures and theorems.	<ul style="list-style-type: none"> • Classify triangles and find the measures of their angles. • Use exterior angles of triangles. 	3.3	page 131 - 139
A	3.2.I Solve real-world problems involving measures of interior or exterior angles of regular polygons.	<ul style="list-style-type: none"> • Classify polygons. • Find the sums of the measures of the interior and exterior angles of polygons. 	3.4	page 143 - 150
C	2.2.A Determine the equation of a line parallel or perpendicular to a given line.	<ul style="list-style-type: none"> • Graph lines given their equations. • Write equations of lines. 	3.5	page 152 - 157
C	2.2.A Determine the equation of a line parallel or perpendicular to a given line.	<ul style="list-style-type: none"> • Relate slope and parallel lines. • Relate slope and perpendicular lines. 	3.6	page 158 – 164
I	4T.2.A Construct bisectors of angles and line segments, perpendicular lines, congruent line segments and angles, and perpendicular bisectors using a variety of methods.	<ul style="list-style-type: none"> • Construct parallel lines. • Construct perpendicular lines. 	3.7	page 165 - 170

Chapter 4: Congruent Triangles

Vocabulary Page 233 of textbook	Writing Prompts <ul style="list-style-type: none"> • List three real life uses of congruent triangles and tell whether you think congruence is necessary and why. • How are SAS and HL alike, and how are they different? • Explain why you cannot use AAA to prove two triangles congruent.
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.1 Analyze relationships among corresponding parts of similar or congruent geometric figures.	<ul style="list-style-type: none"> • Recognize congruent figures and their corresponding parts. 	4.1	page 180 - 185
A	3.2.M Justify triangle congruence given a diagram. 3.9 Apply reflexive, transitive, and symmetric properties when appropriate.	<ul style="list-style-type: none"> • Prove two triangles congruent using the SSS and SAS Postulates. 	4.2	page 186 -192
A	3.2.M Justify triangle congruence given a diagram.	<ul style="list-style-type: none"> • Prove two triangles congruent using the ASA Postulate and the AAS Theorem. 	4.3	page 194 - 201
A	3.2.C Determine congruence or similarity relations between triangles or quadrilaterals given a diagram.	<ul style="list-style-type: none"> • Use triangle congruence and CPCTC to prove that parts of two triangles are congruent. 	4.4	page 203 - 208
A	3.2.A Identify properties of plane figures from information given in a diagram.	<ul style="list-style-type: none"> • Use and apply properties of isosceles triangles. 	4.5	page 210 - 216
A	3.2.M Justify triangle congruence given a diagram.	<ul style="list-style-type: none"> • Prove triangles congruent using the HL Theorem. 	4.6	page 217 - 223
A	3.1 Analyze relationships among corresponding parts of similar or congruent geometric figures.	<ul style="list-style-type: none"> • Identify congruent overlapping triangles. • Prove two triangles congruent by first proving two other triangles congruent. 	4.7	page 224 - 230

Chapter 5: Relationships Within Triangles

Vocabulary Page 281 of textbook	Writing Prompts <ul style="list-style-type: none"> • Why are variables used in proofs instead of numbers? • Explain why the bisector of the vertex angle of an isosceles triangle is both an altitude and a median.
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.1.A Identify corresponding parts of similar and congruent geometric figures given a diagram.	<ul style="list-style-type: none"> • Use properties of midsegments to solve problems. 	5.1	page 243 - 248
A	3.2.J Identify the appropriate segment of a triangle given a diagram and vice versa.	<ul style="list-style-type: none"> • Use properties of perpendicular bisectors and angle bisectors. 	5.2	page 249 - 255
A	3.2.J Identify the appropriate segment of a triangle given a diagram and vice versa.	<ul style="list-style-type: none"> • Identify properties of perpendicular bisectors and angle bisectors. • Identify properties of medians and altitudes of a triangle. 	5.3	page 256 - 263
A I	3T.2.E Write and defend indirect and direct proofs.	<ul style="list-style-type: none"> • Write the negation of a statement and the inverse and contrapositive of a conditional statement. • Use indirect reasoning. 	5.4	page 264 - 272
A	2.2C Solve problems involving complementary, supplementary, congruent, vertical, or adjacent angles given angle measures expressed algebraically.	<ul style="list-style-type: none"> • Use inequalities involving angles of triangles. • Use inequalities involving sides of triangles. 	5.5	page 273 - 280

Chapter 6: Quadrilaterals

<p>Vocabulary</p> <p>Page 339 of textbook</p>	<p>Writing Prompts</p> <ul style="list-style-type: none"> • How can you use slope and distance to classify a quadrilateral? • A quadrilateral has congruent diagonals. Explain why it may or may not be a rectangle. • Summarize the properties of squares that follow it being (a) a parallelogram, (b) a rhombus, and (c) a rectangle.
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.11 Recognize and articulate relationships among families of geometric figures.	<ul style="list-style-type: none"> • Define and classify special types of quadrilaterals. 	6.1	page 286 - 293
A	3.11 Recognize and articulate relationships among families of geometric figures.	<ul style="list-style-type: none"> • Use relationships among sides and among angles of parallelograms. • Use relationships involving diagonals of parallelograms or transversals. 	6.2	page 294 - 301
A	3.11 Recognize and articulate relationships among families of geometric figures.	<ul style="list-style-type: none"> • Determine whether a quadrilateral is a parallelogram. 	6.3	page 303 - 310
A	3.11 Recognize and articulate relationships among families of geometric figures.	<ul style="list-style-type: none"> • Use properties of diagonals of rhombuses and rectangles. • Determine whether a parallelogram is a rhombus or a rectangle. 	6.4	page 312 - 318
A	3.11 Recognize and articulate relationships among families of geometric figures.	<ul style="list-style-type: none"> • Verify and use properties of trapezoids and kites. 	6.5	page 320 - 325
I	2.4 Apply coordinate geometry to analyze and solve problems.	<ul style="list-style-type: none"> • Name coordinates of special figures by using their properties. 	6.6	page 326 - 331
I	2.4 Apply coordinate geometry to analyze and solve problems.	<ul style="list-style-type: none"> • Prove theorems using figures in the coordinate plane. 	6.7	page 332 - 337

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Chapter 7: Area

Vocabulary Page 409 of textbook	Writing Prompts <ul style="list-style-type: none"> • Why does choosing a horizontal side as a base make finding the areas easier? • Why might parking spaces be arranged diagonally instead of perpendicular to the driving region? • Explain why the radius of a regular polygon is greater than the apothem.
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.2.L Determine the area of indicated regions involving circles, squares, rectangles, and/or triangles.	<ul style="list-style-type: none"> • Find the area of a parallelogram. • Find the area of a triangle. 	7.1	page 348 - 354
A	3.7 Apply right triangle relationships including the Pythagorean Theorem, the distance formula, and trigonometric ratios.	<ul style="list-style-type: none"> • Use the Pythagorean theorem. • Use the Converse of the Pythagorean Theorem. 	7.2	page 357 - 364
A	3.2.G Find the missing side length in a 30-60-90 or 45-45-90 degree triangle without rationalizing the denominator. 1.2 Choose and use appropriate notations for rational and irrational numbers.	<ul style="list-style-type: none"> • Use the properties of 45°-45°-90° triangles. • Use the properties of 30°-60°-90° triangles. 	7.3	page 366 - 372
A	3.2.L Determine the area of indicated regions involving circles, squares, rectangles, and/or triangles.	<ul style="list-style-type: none"> • Find the area of a trapezoid. • Find the area of a rhombus or a kite. 	7.4	page 373 - 379
A	3.2.L Determine the area of indicated regions involving circles, squares, rectangles, and/or triangles.	<ul style="list-style-type: none"> • Find the area of a regular polygon. 	7.5	page 380 – 385
A	3.3.A Solve problems involving the properties of arcs, chords, tangents, or secants.	<ul style="list-style-type: none"> • Find the measures of central angles and arcs. • Find circumference and arc length. 	7.6	page 386 - 393
A	3.2.L Determine the area of indicated regions involving circles, squares, rectangles, and/or triangles.	<ul style="list-style-type: none"> • Find the areas of circles, sectors, and segments of circles. 	7.7	page 395 - 400
A	5.1 Apply geometric representations to calculate theoretical probability.	<ul style="list-style-type: none"> • Use segments and area models to find the probabilities of events. 	7.8	page 402 - 407

Chapter 8: Similarity

Vocabulary Page 461 of textbook	Writing Prompts <ul style="list-style-type: none"> • Are two congruent figures similar? Explain. • Name something with a height that would be difficult to measure directly. Describe how you could measure it indirectly.
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
C	2.5 Apply ratio and proportion to problems involving similar figures.	<ul style="list-style-type: none"> • Write ratios and solve proportions. 	8.1	page 416 - 421
A	2.2.B Apply ratio and proportion to solve real-world problems involving polygons.	<ul style="list-style-type: none"> • Identify similar polygons. • Apply similar polygons. 	8.2	page 423 - 429
A	3.2.C Determine congruence or similarity relations between triangles or quadrilaterals.	<ul style="list-style-type: none"> • Use AA, SAS, and SSS similarity statements. • Apply AA, SAS, and SSS similarity statements. 	8.3	page 432 - 438
A	3.1 Analyze relationships among corresponding parts of similar or congruent geometric figures.	<ul style="list-style-type: none"> • Find and use relationships in similar right triangles. 	8.4	page 439 - 444
A	3.2.A Identify properties of plane figures from information given in a diagram.	<ul style="list-style-type: none"> • Use the Side-Splitter Theorem. • Use the Triangle-Angle-Bisector Theorem. 	8.5	page 446 - 452
A	2.5 Apply ratio and proportion to problems involving similar figures.	<ul style="list-style-type: none"> • Find the perimeters and areas of similar figures. 	8.6	page 454 - 459

Chapter 9: Right Triangle Trigonometry

<p>Vocabulary</p> <p>Page 505 of textbook</p>	<p>Writing Prompts</p> <ul style="list-style-type: none"> • Explain why $\tan 60^\circ = \sqrt{3}$. Include a diagram. • If you knew the measure of one acute angle and the length of one side of a right triangle, could you find the measure of the other acute angle, and the lengths of the other sides? Explain • How do you determine which trigonometric ratio to use to solve a problem?
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.7 Apply right triangle relationships including the Pythagorean Theorem, the distance formula, and trigonometric ratios.	<ul style="list-style-type: none"> • Use tangent ratios to determine side lengths in triangles. 	9.1	page 470 - 475
A	3.7 Apply right triangle relationships including the Pythagorean Theorem, the distance formula, and trigonometric ratios.	<ul style="list-style-type: none"> • Use sine and cosine to determine side lengths in triangles. 	9.2	page 477 - 481
A	3.2.F Determine the trigonometric ratio for a right triangle needed to solve a real-world problem given a diagram.	<ul style="list-style-type: none"> • Use angles of elevation and depression to solve problems. 	9.3	page 482 - 488
I	3.2 Apply geometric properties of solids, polygons, and circles to solve real-world problems.	<ul style="list-style-type: none"> • Describe vectors. • Solve problems that involve vector addition. 	9.4	page 490 - 497
A	3.7 Apply right triangle relationships including the Pythagorean Theorem, the distance formula, and trigonometric ratios.	<ul style="list-style-type: none"> • Find the area of a regular polygon using trigonometry. 	9.5	page 498 - 503

Chapter 10: Surface Area and Volume

Vocabulary Page 573 of textbook	Writing Prompts <ul style="list-style-type: none"> • Suppose you double the radius of a right cylinder. How does that affect the lateral area? • How is finding the surface area of a pyramid like finding the surface area of a prism? How is it different? • Explain why all spheres are similar.
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.2.K Determine which three-dimensional solid is represented by a given net.	<ul style="list-style-type: none"> • Recognize nets of space figures. 	10.1	page 512 - 516
I	3.5 Communicate position using spatial sense with two and three dimensional coordinate systems.	<ul style="list-style-type: none"> • Make isometric and orthographic drawings. • Describe cross sections of three-dimensional figures. 	10.2	page 520 - 526
A	4.2.A Determine the volume or surface area of a rectangular solid or cylinder.	<ul style="list-style-type: none"> • Find the surface area of a prism. • Find the surface area of a cylinder. 	10.3	page 528 - 535
A	4.2 Apply measurement concepts and relationships in algebra and geometric problem-solving situations.	<ul style="list-style-type: none"> • Find the surface area of a pyramid. • Find the surface area of a cone. 	10.4	page 537 - 543
A	4T.2.B Solve problems involving volume of 3-dimensional figures.	<ul style="list-style-type: none"> • Find the volume of a prism. • Find the volume of a cylinder. 	10.5	page 544 - 550
A	4T.2.B Solve problems involving volume of 3-dimensional figures.	<ul style="list-style-type: none"> • Find the volume of a pyramid. • Find the volume of a cone. 	10.6	page 551 - 557
A	4.2 Apply measurement concepts and relationships in algebra and geometric problem-solving situations.	<ul style="list-style-type: none"> • Find the surface area and volume of a sphere. 	10.7	page 558 - 564
A	4.2 Apply measurement concepts and relationships in algebra and geometric problem-solving situations	<ul style="list-style-type: none"> • Find relationships between the ratios of the area and volume of similar solids. 	10.8	page 566 - 571

Chapter 11: Circles

<p>Vocabulary</p> <p>Page 627 of textbook</p>	<p style="text-align: center;">Writing Prompts</p> <ul style="list-style-type: none"> • A parallelogram inscribed in a circle must be what kind of parallelogram? Explain. • Why is it not possible to conclude that a line and a circle are tangent by viewing their graphs? • Explain the difference between a chord and a secant.
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.3.A Solve problems involving the properties of arcs, chords, tangents, or secants.	<ul style="list-style-type: none"> • Use the relationship between a radius and a tangent. • Use the relationship between two tangents from one point. 	11.1	page 582 - 589
A	3.3.A Solve problems involving the properties of arcs, chords, tangents, or secants.	<ul style="list-style-type: none"> • Use congruent chords, arcs, and central angles. • Recognize properties of lines through the center of a circle. 	11.2	page 590 - 596
A	3.2.B Identify chords, inscribed angles, or central angles of circles given a diagram.	<ul style="list-style-type: none"> • Find the measure of an inscribed angle. • Find the measure of an angle formed by a tangent and a chord. 	11.3	page 598 - 605
A	3.2.B Identify chords, inscribed angles, or central angles of circles given a diagram.	<ul style="list-style-type: none"> • Find the measures of angles formed by chords, secants, and tangents. • Find the lengths of segments associated with circles. 	11.4	page 607 - 613
C I	2.3.A Determine the equation of a circle given coordinates or graph of the circle.	<ul style="list-style-type: none"> • Write an equation of a circle. • Find the center and radius of a circle. 	11.5	page 615 - 620
I	3.8 Describe geometric objects and recognize minimal conditions necessary to define geometric objects.	<ul style="list-style-type: none"> • Draw and describe a locus. 	11.6	page 621 - 625

Chapter 12: Transformations

<p>Vocabulary</p> <p>Page 681 of textbook</p>	<p>Writing Prompts</p> <ul style="list-style-type: none"> • Describe in words the translation represented by the vector $\langle -3, 5 \rangle$. • Name the four types of isometries. • Does a regular octagon have reflectional and/or rotational symmetry?
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Key	State Performance Indicators	Knox County Performance Objectives	Textbook Correlation	
			Section	Pages
A	3.6 Demonstrate an understanding of transformations of geometric figures. 5.2 Use data analysis to investigate geometric relationships.	<ul style="list-style-type: none"> • Identify isometries. • Find reflection images of figures. 	12.1	page 634 - 639
A	3.6 Demonstrate an understanding of transformations of geometric figures.	<ul style="list-style-type: none"> • Describe translations using vectors. • Find translation images using matrix and vector sums. 	12.2	page 641 - 646
A	3.6 Demonstrate an understanding of transformations of geometric figures.	<ul style="list-style-type: none"> • Draw and identify rotation images of figures. 	12.3	page 647 - 652
I	3.2.D Determine whether a plane figure has been translated, dilated, reflected, or rotated given a diagram.	<ul style="list-style-type: none"> • Use a composition of reflections. • Identify glide reflections. 	12.4	page 654 - 660
A	3.6 Demonstrate an understanding of transformations of geometric figures.	<ul style="list-style-type: none"> • Identify the type of symmetry in a figure. 	12.5	page 662 - 666
I	3.6 Demonstrate an understanding of transformations of geometric figures.	<ul style="list-style-type: none"> • Identify transformations in tessellations, and figures that will tessellate. • Identify symmetries in tessellations. 	12.6	page 667 - 673
A	3.6 Demonstrate an understanding of transformations of geometric figures.	<ul style="list-style-type: none"> • Locate dilation images of figures. 	12.7	page 674 - 679