



Topic C:

Use Equations and Inequalities to Solve Geometry Problems

7.G.B.4, 7.G.B.6

Focus Standards:	7.G.B.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
	7.G.B.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Instructional Days:	11	
Lesson 16:	The Most Famous Ratio of All (M) ¹	
Lesson 17:	The Area of a Circle (E)	
Lesson 18:	More Problems on Area and Circumference (P)	
Lesson 19:	Unknown Area Problems on the Coordinate Plane (P)	
Lesson 20:	Composite Area Problems (P)	
Lessons 21–22:	Surface Area (P)	
Lessons 23–24:	The Volume of a Right Prism (E)	
Lessons 25–26:	Volume and Surface Area (P)	

Topic C begins with students discovering the greatest ratio of all, pi. In Lesson 16, students use a compass to construct a circle and extend their understanding of angles and arcs from earlier grades to develop the definition of a circle through exploration. A whole-group activity follows, in which a wheel, chalk, and string are used to physically model the ratio of a circle's circumference to its diameter. Through this activity, students conceptualize pi as a number whose value is a little more than 3. The lesson continues to examine this relationship between a circle's circumference and diameter, as students understand pi to be a constant, which can be represented using approximations.

¹ Lesson Structure Key: **P**-Problem Set Lesson, **M**-Modeling Cycle Lesson, **E**-Exploration Lesson, **S**-Socratic Lesson

Students see the usefulness of approximations such as $\frac{22}{7}$ and 3.14 to efficiently solve problems related to the circumference of circles and semicircles. Students continue examining circles in Lesson 17, as they discover what happens if they cut a circle of radius length r into equivalent-sized sectors and rearrange them to resemble a rectangle. Applying what they know about the area of a rectangle, students examine the dimensions to derive a formula for the area of the circle (**7.G.B.4**). They use this formula, $A = \pi r^2$, to solve problems with circles. In Lesson 18, students consider how to adapt the area and circumference formulas to examine interesting problems involving *quarter circle* and *semicircle* regions. Students analyze figures to determine composite area in Lesson 19 and 20 by composing and decomposing into familiar shapes. They use the coordinate plane as a tool to determine the length and area of figures with vertices at grid points.

This topic concludes as students apply their knowledge of plane figures to find the surface area and volume of three-dimensional figures. In Lessons 21 and 22, students will use polyhedron nets to understand surface area as the sum of the area of the lateral faces and the area of the base(s) for figures composed of triangles and quadrilaterals. In Lessons 23 and 24, students will recognize the volume of a right prism to be the area of the base times the height and compute volumes of right prisms involving fractional values for length (**7.G.B.6**). In the last two lessons, students solidify their understanding of two- and three-dimensional objects as they solve real-world and mathematical problems involving area, volume, and surface area.