

Unit 17: Circle Theorems

Students analyze and apply properties of tangents to a circle and the angles and polygons formed within.

Unit 18: Area of Circles and Polygons

Students determine the area of circles and various polygons including area and perimeter of similar figures.

Geometry Cycle 5 TEKS

Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

GEOM.1G Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

Logical Arguments and Constructions. The student uses constructions to validate conjectures about geometric figures. The student is expected to:

Ⓡ **GEOM.5A Investigate patterns to make conjectures about geometric relationships, including** angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and **special segments and angles of circles choosing from a variety of tools.**

Ⓢ **GEOM.5C** Use the constructions of congruent segments, congruent angles, angle bisectors, and perpendicular bisectors to make conjectures about geometric relationships.

Proof and Congruence. The student uses the process skills with deductive reasoning to prove and apply theorems by utilizing a variety of methods such as coordinate, transformational, axiomatic and formats such as two-column, paragraph, flow chart. The student is expected to:

Ⓡ **GEOM.6A** Verify theorems about angles formed by the intersection of lines and line segments, including vertical angles, angles formed by parallel lines cut by a transversal, and prove equidistance between the endpoints of a segment and points on its perpendicular bisector, and apply these relationships to solve problems.

Circles. The student uses the process skills to understand geometric relationships and apply theorems and equations about circles. The student is expected to:

Ⓢ **GEOM.12A** Apply theorems about circles, including relationships among angles, radii, chords, tangents, and secants, to solve non-contextual problems.

Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

GEOM.1B Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.

GEOM.1C Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.

Proof and Congruence. The student uses the process skills with deductive reasoning to prove and apply theorems by utilizing a variety of methods such as coordinate, transformational, axiomatic and formats such as two-column, paragraph, flow chart. The student is expected to:

Ⓢ **GEOM.6D** Verify theorems about the relationships in triangles, including proof of the Pythagorean Theorem, the sum of interior angles, base angles of isosceles triangles, midsegments, and medians and apply these relationships to solve problems.

Similarity, Proof, and Trigonometry. The student uses the process skills to understand and apply relationships in right triangles. The student is expected to:

Ⓡ **GEOM.9B** Apply the relationships in special right triangles (30° - 60° - 90° and 45° - 45° - 90°) and the Pythagorean Theorem, including Pythagorean triples, to solve problems.

Geometry Cycle 5 TEKS

Two-dimensional and three-dimensional figures. The student uses the process skills to recognize characteristics and dimensional changes of two- and three-dimensional figures. The student is expected to:

Ⓡ **GEOM.10B** Determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and non-proportional dimensional change.

Two-dimensional and Three-dimensional Figures. The student uses the process skills in the application of formulas to determine measures of two- and three-dimensional figures. The student is expected to

Ⓢ **GEOM.11A** Apply the formula for the area of regular polygons to solve problems using appropriate units of measure.

Ⓡ **GEOM.11B** Determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure.

Unit 19: Trigonometry and Area

Students use trigonometry to determine the area of regular polygons.

Mathematical Process Standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

GEOM.1B Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.

GEOM.1C Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.

Similarity, Proof, and Trigonometry

The student uses the process skills to understand and apply relationships in right triangles. The student is expected to:

Ⓡ **GEOM.9A** Determine the lengths of sides and measures of angles in a right triangle by applying the trigonometric ratios sine, cosine, and tangent to solve problems.

Two-dimensional and Three-dimensional Figures. The student uses the process skills in the application of formulas to determine measures of two- and three-dimensional figures. The student is expected to:

Ⓢ **GEOM.11A** Apply the formula for the area of regular polygons to solve problems using appropriate units of measure.