

Pre Calc and College Math TEKS for Cycle 5

Unit 15: Arithmetic and Geometric Sequences and Series

Students apply and analyze real-world problems using geometric and arithmetic sequences and series.

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

PC.1A Apply mathematics to problem arising in everyday life, society, and the workplace.

PC.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

PC.1D Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

Algebraic Reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:

PC.5A Evaluate finite sums and geometric series, when possible, written in sigma notation.

PC.5B Represent arithmetic sequences and geometric sequences using recursive formulas.

PC.5C Calculate the n th term and the n th partial sum of an arithmetic series in mathematical and real-world problems.

PC.5D Represent arithmetic series and geometric series using sigma notation.

PC.5E Calculate the n th term of a geometric series, the n th partial sum of a geometric series, and sum of an infinite geometric series when it exists.

Unit 16: Binomial Theorem

Students use mathematical induction to prove formulas such as the Binomial Theorem.

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

PC.1A Apply mathematics to problem arising in everyday life, society, and the workplace.

PC.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.

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

Algebraic Reasoning. The student uses process standards in mathematics to evaluate expressions, describe patterns, formulate models, and solve equations and inequalities using properties, procedures, or algorithms. The student is expected to:

PC.5F Apply the Binomial Theorem for the expansion of $(a + b)^n$ in powers of a and b for a positive integer n , where a and b are any numbers.

Unit 17:

Introduction to Conic Sections

Students explore and apply properties of conic sections.

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

PC.1A Apply mathematics to problem arising in everyday life, society, and the workplace.

PC.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.

PC.1F Analyze mathematical relationships to connect and communicate

mathematical ideas.

Relations and Geometric Reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:

- PC.3F** Determine the conic section formed when a plane intersects a double-napped cone.
- PC.3G** Make connections between the locus definition of conic sections and their equations in rectangular coordinates.

Pre Calc and College Math TEKS for Cycle 6

Unit 18:

Attributes of Ellipse and Hyperbola

Students examine the properties of an ellipse and hyperbola to write their equations.

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

PC.1A Apply mathematics to problem arising in everyday life, society, and the workplace.

PC.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.

PC.1F Analyze mathematical relationships to connect and communicate mathematical ideas.

Relations and Geometric Reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:

- PC.3H** Use the characteristics of an ellipse to write the equation of an ellipse with center (h, k) .
- PC.3I** Use the characteristics of a hyperbola to write the equation of a hyperbola with center (h, k) .

Unit 19: Parametric Equations and Plane Curves

Students analyze parametric equations in real-world situations.

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

PC.1A Apply mathematics to problem arising in everyday life, society, and the workplace.

PC.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.

Relations and Geometric Reasoning. The student uses the process standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:

PC.3A Graph a set of parametric equations.

PC.3B Convert parametric equations into rectangular relations and convert rectangular relations into parametric equations.

- PC.3C** Use parametric equations to model and solve mathematical and real-world problems.

Unit 20:

Polar Coordinates, Equations, and Graphs

Students explore the properties and relationships of the polar coordinate system and the Cartesian coordinate system. They represent complex numbers in polar form and use polar coordinates to graph and apply functions in real-world situations.

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

PC.1D Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

PC.1E Create and use representations to organize, record, and communicate mathematical ideas.

Relations and Geometric Reasoning. The student uses the process

standards in mathematics to model and make connections between algebraic and geometric relations. The student is expected to:

- PC.3D** Graph points in the polar coordinate system and convert between rectangular coordinates and polar coordinates.
- PC.3E** Graph polar equations by plotting points and using technology.

Unit 21:

Vectors

Students explore two- and three-dimensional applications of vectors through dot products and cross products.

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

PC.1A Apply mathematics to problem arising in everyday life, society, and the workplace.

PC.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.

PC.1D Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.

Number and Measure. The student uses process standards in mathematics to apply appropriate techniques, tools, and formulas to calculate measures in mathematical and real-world problems. The student is expected to:

PC.4I Use vectors to model situations defined by magnitude and direction.

PC.4J Represent the addition of vectors and the multiplication of a vector by a scalar geometrically and symbolically.

PC.4K Apply vector addition and multiplication of a vector by a scalar in mathematical and real-world problems.