

Iowa Mathematics

Precalculus

F-PREL. Operations with Polynomial, Rational, Exponential, and Logarithmic Functions PC.F-PREL

- 1 Identify, graph, analyze functions and perform function operations. PC.F-PREL.A
 - 1 Understand the concept of a function and its notation. PC.F-PREL.A.1
 - 2 Identify and graph various functions, including linear, quadratic, polynomial, rational, exponential, logarithmic, and trigonometric functions. PC.F-PREL.A.2
 - 3 Analyze functions by considering domain, range, symmetry, intercepts, and asymptotic behavior. PC.F-PREL.A.3
 - 4 Perform operations of addition, subtraction, multiplication, division, and composition of functions. PC.F-PREL.A.4
- 2 Analyze, graph, and solve problems using polynomial and rational functions. PC.F-PREL.B
 - 1 Describe how quantities change with respect to each other. PC.F-PREL.B.1
 - 2 Understand the behavior of polynomial functions, including end behavior, turning points, and factors. PC.F-PREL.B.2
 - 3 Perform polynomial long division and synthetic division. PC.F-PREL.B.3
 - 4 Identify and graph rational functions and analyze their asymptotic behavior and discontinuities. PC.F-PREL.B.4
 - 5 Solve polynomial and rational equations and inequalities. PC.F-PREL.B.5
 - 6 Model aspects of scenarios using polynomial and rational functions. PC.F-PREL.B.6
 - 7 Identify assumptions and limitations of function models. PC.F-PREL.B.7
- 3 Analyze, graph, and solve problems using exponential and logarithmic functions. PC.F-PREL.C
 - 1 Define exponential and logarithmic functions and their properties. PC.F-PREL.C.1
 - 2 Compose exponential and logarithmic functions and find inverses. PC.F-PREL.C.2
 - 3 Graph exponential and logarithmic functions and understand their transformations. PC.F-PREL.C.3
 - 4 Solve exponential and logarithmic equations and inequalities. PC.F-PREL.C.4
 - 5 Apply exponential and logarithmic functions in realworld contexts such as population growth, compound interest, and exponential decay. PC.F-PREL.C.5
 - 6 Model data sets with exponential functions. PC.F-PREL.C.6

F-TF. Properties of Trigonometric Functions [PC.F-TF](#)

- 1 Analyze, graph, and solve problems using trigonometric functions. [PC.F-TF.A](#)
 - 1 Define trigonometric functions and their reciprocal functions. [PC.F-TF.A.1](#)
 - 2 Graph trigonometric functions including sine, cosine, tangent, cosecant, secant, and cotangent. [PC.F-TF.A.2](#)
 - 3 Understand the unit circle and use it to define trigonometric values for unique angles. [PC.F-TF.A.3](#)
 - 4 Use inverse trigonometric functions to solve trigonometric equations. [PC.F-TF.A.4](#)
 - 5 Solve trigonometric equations and inequalities and apply trigonometric identities. [PC.F-TF.A.5](#)
 - 6 Model data and scenarios with sinusoidal functions. [PC.F-TF.A.6](#)
 - 7 Graphing functions using polar coordinates. [PC.F-TF.A.7](#)
 - 8 Describe how angles and radii change with respect to each other in a polar graph. [PC.F-TF.A.8](#)
- 2 Use trigonometric identities to solve problems. [PC.F-TF.B](#)
 - 1 Use trigonometric identities to simplify expressions and verify identities. [PC.F-TF.B.1](#)
 - 2 Solve trigonometric equations using algebraic and graphical methods. [PC.F-TF.B.2](#)
 - 3 Apply trigonometric identities to solve problems involving triangles, vectors, and periodic phenomena. [PC.F-TF.B.3](#)

F-AG. Analytic Geometry [PC.F-AG](#)

- 1 Solve problems using properties of analytic geometry. [PC.F-AG.A](#)
 - 1 Understand the properties of conic sections, including circles, parabolas, ellipses, and hyperbolas. [PC.F-AG.A.1](#)
 - 2 Graph conic sections in standard and general forms. [PC.F-AG.A.2](#)
 - 3 Solve problems involving distance, midpoint, slope, and equations of lines and circles. [PC.F-AG.A.3](#)
 - 4 Use transformations to analyze and graph geometric figures. [PC.F-AG.A.4](#)

F-SS. Reasoning with Sequences and Series PC.F-SS

- 1 Solve problems involving sequences and series. PC.F-SS.A
 - 1 Define arithmetic and geometric sequences and series. PC.F-SS.A.1
 - 2 Find the n th term, partial sums, and sums of finite and infinite sequences and series. PC.F-SS.A.2
 - 3 Apply sequences and series to solve problems in mathematics and other disciplines. PC.F-SS.A.3
- 2 Reason with functions involving parameters, vectors, and matrices. PC.F-SS.B
 - 1 Describe how quantities change with respect to each other in a parametric function. PC.F-SS.B.1
 - 2 Graph conic sections using implicitly defined functions and parametric functions. PC.F-SS.B.2
 - 3 Use vectors to describe the motion of an object. PC.F-SS.B.3
 - 4 Describe the impact of a transformation matrix on a graphical object. PC.F-SS.B.4
 - 5 Model change in a context using matrices. PC.F-SS.B.5