

NPSD Middle & High School Curriculum

Department: Mathematics

Course: Algebra 2

Students can find the inverse of a function.

Promise Standards

- 1A - I can find the inverse of a function. (F.BF.4a)
- 1B - I can solve exponential equations. ([F.BF.B.4a](#))
- 1C - I can solve logarithmic equations. ([F.BF.B.5](#))
- 1D - I can graph inverse functions. (F.IF.C.7)

Essential Learning Targets

- "ELT 1 - I can find inverse functions and relations (undoing, table, graph, equation) (F.BF.B.4a, F.IF.5, A.CED.4)
- ELT 2 - I can solve exponential equations using logarithms. (F.BF.B.4a, F.LE.A.4)
- ELT 3 - I can solve basic logarithmic equations. (F.BF.B.5, F.LE.A.4)
- ELT 4 - I can solve complex logarithmic equations. (F.BF.B.5)
- ELT 5 - I can identify inverse functions (verify from table, graph, equation, composition) (F.BF.B.4c +, F.BF.B.4b)
- ELT 6 - I can restrict the domain of a function to get an invertible function. (F.BF.B.4d +, [F.IF.5](#))
- ELT 7 - I can graph inverse functions (including cube root). (F.IF.C.7, [F.IF.C.7b](#))
- ELT 8 - I can write the equation of an exponential function given 2 points. (F.LE.A.2) solve complex logarithmic equations. (F.BF.B.5)

Students can model and apply trigonometric functions.

Promise Standards

- 2A - I can model periodic situations with graph. (F.TF.B.5)
- 2B - I can model periodic situations with equation. ([F.TF.B.5](#))
- 2C- I can understand and apply methods to solve trigonometric situations. ([F.TF.A.1](#))
- 2D - I can convert between radians and degrees. ([F.TF.1](#))
- 2E - I can understand and apply the unit circle. (F.TF.A.4)

Essential Learning Targets

- ELT 1 - I can model cyclic functions (F.TF.B5)
- ELT 2 - I can construct the unit circle (degrees/radians). (F.TF.A.2)
- ELT 3 - I can understand and apply the relationship between the unit circle and a trig graph. (F.TF.A.4)
- ELT 4 - I can use special right triangles to find exact values within the unit circle. (F.TF.A.3 +)
- ELT 5 - I can understand and apply degrees to solve trigonometric situations. (G.SRT.C.8 - supporting standard)
- ELT 6 - I can convert between degrees and radians. (G.C.B.5, F.TF.1)
- ELT 7 - I can understand and apply radians to solve trigonometric situations. (F.TF.A.1, F.TF.A.2)
- ELT 8 - I can develop the equation for trigonometric situation. (F.TF.B.5)
- ELT 9 - I can model a trigonometric function with a graph (sine, cosine, tangent). (F.TF.B.5, F.IF.C.7e)
- ELT 10 - I can convert between graphs and equation of trigonometric functions. (F.IF.C.9)
- ELT 11 - I can transform trig functions (equation/graph). (F.IF.C9, F.TF.B.5, F.IF.C.7e)

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Students will investigate parent graphs and transformations.

Promise Standards

- 3A - I can determine the transformations that occur (graph or equation). ([F.BF.B.3](#))
- 3B - I can fully investigate a graph and/or table (domain, range, key points, table, graph, describe, shape/symmetry, interpret domain/range, list asymptotes). ([F.IF.C.8](#))
- 3C - I can identify the effect of a transformation on a graph. (F.IF.A.1, [F.IF.B.4](#))
- 3D - I can graph functions expressed symbolically and show key features of the graph (F.IF.C.7a-e)

Essential Learning Targets

- ELT 1 - I can transform trig functions (equation/graph). (F.IF.C9, F.TF.B.5, [F.IF.C.7e](#))
- ELT 2 - I can fully investigate a graph and/or table. (F.IF.A.1, [F.IF.B.4](#))
- ELT 3 - I can describe and interpret the domain of a function/graph. ([F.IF.B.5](#))
- ELT 4 - I can graph parent graphs (quadratic, cubic, square root, absolute value, hyperbola, exponential, linear)(key points-intercepts max/min) ([F.IF.C.7a,b,c,d,e](#))
- ELT 5 - I can graph cube root and piece-wise defined functions. ([F.IF.7b](#))
- ELT 6 - I can graph polynomial functions (zeros, end behavior). (F.IF.7c)
- ELT 7 - I can graph rational functions (zeros, asymptotes, end behavior). ([F.IF.7d+](#))
- ELT 8 - I can graph exponential and logarithmic functions (intercepts/end behavior). ([F.IF.7e](#))
- ELT 9 - I can graph trigonometric functions (period, midline, amplitude). ([F.IF.7e](#))
- ELT 10 - I can use factoring/completing the square to show zeros, extremes, and symmetry of a quadratic graph and interpret them in context. (F.IF.C.8a)
- ELT 11 - I can rewrite expressions to reveal and explain different properties of the function. ([F.IF.C.8](#))
- ELT 12 - I can determine the transformations that occur from a graph. ([F.BF.B.3](#))
- ELT 13 - I can identify the effect that a, b, h, and k have. (F.BF.B.3)

Students will be able to model and perform operations on rational expressions and polynomial functions.

Promise Standards

- 4A - I can solve polynomial equations with real and complex roots. (N.CN.C.8, N.CN.C.7, [N.CN.A.1](#))
- 4B - I can manipulate and rewrite polynomials and rational expressions. (A.SSE.A.1a, A.SSE.A.1b, A.SSE.A.2, A.APR.D.6, A.APR.B.2)
- 4C - I can find and use the zeros of polynomial functions. (A.SSE.B.3a, A.APR.B.2, A.APR.B.3)
- 4D - I can perform the operations on rational expressions and polynomials. (A.APR.A.1, A.APR.D.6, A.APR.D.7+)
- 4E - I can solve polynomial equations and simple rational and simple radical equations. (A.SSE.B.3a, A.REI.A.2, A.REI.A.11)

Essential Learning Targets

- ELT 1 - I can write numbers in complex form $a+bi$. (N.CN.A.1)
- ELT 2 - I can solve quadratic equations (real and complex). ([N.CN.C.7](#))
- ELT 3 - I can solve polynomial equations with real and complex roots. (N.CN.C.8 - conjugate roots+)
- ELT 4 - I can apply the Fundamental Theorem of Algebra to determine the number of roots in a polynomial (real and complex). (N.CN.C.9 +)
- ELT 5 - I can interpret parts of an expression (terms, factors, coefficients). (A.SSE.A.1a)

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- ELT 6 - I can manipulate complicated expressions by viewing one or more of their parts as a single entity. (A.SSE.A.1b)
- ELT 7 - I can rewrite expressions by using the structure of an expression to identify ways to rewrite it (factoring, rewriting with like terms, distributing, etc.). (A.SSE.A.2)
- ELT 8 - I can factor, use quadratic formula, or complete the square to reveal the zeros of the function. (A.SSE.B.3a)
- ELT 9 - I understand that polynomials are closed under the operations of addition, subtraction, and multiplication. (A.APR.A.1)
- ELT 10 - I can apply the remainder theorem to know that $(x-a)$ is a factor of $P(x)$. (A.APR.B.2)
- ELT 11 - I can use the zeros to construct a rough graph of a polynomial. (A.APR.B.3)
- ELT 12 - I can rewrite simple rational expressions in different forms (polynomial division). (A.APR.D.6)
- ELT 13 - I can add, subtract, multiply, and divide rational expressions. (A.APR.D.7+)
- ELT 14 - I can solve simple rational and radical equations in one variable. (extraneous solutions). (A.REI.A.2)
- ELT 14 - I can solve simple rational and radical equations in one variable. (extraneous solutions). (A.REI.A.2)
- ELT 15 - I can use a graph to solve an equation (finding the x coordinate). (linear, polynomial, rational, absolute value, exponential, logarithmic) (A.REI.A.11)
- ELT 16 - I can rewrite quadratic equations in different forms (standard, factored, vertex/graphing form). (A.REI.A.2)

Students will be able to solve and understand systems of equations and inequalities.

Promise Standards

- 5A - I can create and solve equations/inequalities/expressions to represent relationships and constraints in various contexts. (A.CED.A.3, A.REI.A.2, A.CED.A.2)
- 5B - I can solve a system of equations (2D & 3D). (A.CED.A.3)
- 5C - I can use 3 points to write the equation of a quadratic function algebraically. (A.CED.A.2)
- 5D - I can create equations to represent relationships between quantities. (A.CED.A.3, A.CED.2)
- 5E - I can graph in 3D variables (A.CED.2)

Essential Learning Targets

- ELT 1 - I can create linear equations and systems to represent relationships between quantities. (A.CED.A.2)
- ELT 2 - I can create and solve systems of linear equations (substitution, graphing, elimination, equal values). (A.CED.3, A.REI.C.6, A.CED.2)
- ELT 3 - I can create equations/inequalities to represent constraints in a modeling context. (interpreting variable solutions in terms of those constraints) (A.CED. A.3)
- ELT 4 - I can create quadratic equations with vertex and another point. (A.CED.A.2)
- ELT 5 - I can create quadratic equations from zeros. (A.CED.A.2)
- ELT 6 - I can create a polynomial function from the zeros/roots. (A.CED.A.2)
- ELT 7 - I can create a quadratic equation given 3 points, using a system of 3 equations. (A.CED.A.2)
- ELT 8 - I can write and solve systems of inequalities (2D). (A.CED.A.3)
- ELT 9 - I can graph in 3D. (A.CED.A.2)
- ELT 10 - I can solve a system of equations in 3D. (A.CED.A.3)
- ELT 11 - I can solve absolute value equations. (A.CED.A.3)