

Real & Complex Solutions

3.1 Analyze radical functions

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Solve radical equations (A.REI.2)	Can extend thinking beyond the standard, including tasks that may involve one of the following:	Solve a radical equation with multiple radicals and identify extraneous solutions	Solve a radical equation with a variable on both sides and identify extraneous solutions	Solve a multi-step radical equation	Little evidence of reasoning or application to solve the problem
Graph and interpret radical functions (F.IF.7b)	<ul style="list-style-type: none"> Designing 	Identify the meaning of a point from both graphs and verbal/written descriptions in terms of the context	Identify the meaning of a point from a graph or verbal/written description in terms of the context	Identify the meaning of a point from a graph or verbal/written description	Does not meet the criteria in a level 1
Identify Transformations (F.BF.3)	<ul style="list-style-type: none"> Connecting Synthesizing Applying Justifying Critiquing Analyzing Creating Proving 	Identify the effect on a graph by replacing $f(x)$ with more than two transformations: $f(x) + k$, $a f(x)$, $f(bx)$, $f(x + h)$ for specific positive and negative values of the constants a , b , h , and k Write a function given more than two transformations.	Identify the effect on a graph by replacing $f(x)$ with two transformations: $f(x) + k$, $a f(x)$, $f(bx)$, $f(x + h)$ for specific positive and negative values of the constants a , b , h , and k Write a function given two transformations.	Identify the effect on a graph by replacing $f(x)$ with a single transformation: $f(x) + k$, $a f(x)$, $f(bx)$, $f(x + h)$ for specific positive and negative values of the constants a , b , h , and k Write a function given a transformation.	
Compare key features (F.IF.9)		Compare key features of two functions represented <ul style="list-style-type: none"> algebraically graphically numerically in tables verbal descriptions Key features include: <ul style="list-style-type: none"> intercepts domain/range increasing or decreasing positive or negative symmetries end behavior 	Compare key features of two functions represented <ul style="list-style-type: none"> algebraically graphically numerically in tables verbal descriptions Key features include: <ul style="list-style-type: none"> intercepts domain/range increasing or decreasing 	Compare key features of two functions represented <ul style="list-style-type: none"> algebraically graphically numerically in tables verbal descriptions Key features include: <ul style="list-style-type: none"> intercepts domain/range 	

A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x + k)$, $k f(x)$, $f(kx)$ and $f(x) + k$, for specific values of k (both negative and positive); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

Real & Complex Solutions

3.2 Determine complex quadratic roots

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Operations with complex numbers (N.CN.1, N.CN.2)	Can extend thinking beyond the standard, including tasks that may involve one of the following:	Use the relation $i^2 = -1$ and the properties of operations to add, subtract and multiply complex numbers and write the solution in standard form	Use the relation $i^2 = -1$ and the properties of operations to add and subtract complex numbers and write the solution in standard form	Use the relation $i^2 = -1$ and the properties of operations to add and subtract complex numbers, but does not write all solutions in standard form	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1
Solve quadratic equations with complex roots (N.CN.7)	<ul style="list-style-type: none"> • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving 	Solve quadratic equations with complex roots using both of the following <ul style="list-style-type: none"> • Quadratic formula • Factoring 	Solve quadratic equations with complex roots using one of the following <ul style="list-style-type: none"> • Quadratic formula • Factoring 	Determine if a quadratic has complex or real roots	

N.CN.1 Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.

N.CN.2 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

N.CN.7 Solve quadratic equations with real coefficients that have complex solutions.