

Algebra 2 EOY

Evidence Statement Key	Evidence Statement Text	Clarifications	MP	Calculator
N-RN.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	None	7	Item Specific
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.	None	7	Item Specific
N-CN.2	Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	None	6, 7	No
N-CN.7	Solve quadratic equations with real coefficients that have complex solutions.	i) Tasks are limited to equations with non-real solutions.	5	Item Specific
A-SSE.2-3	Use the structure of polynomial, rational or exponential expressions to identify ways to rewrite it. <i>For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</i>	i) Additional examples: In the equation $x^2 + 2x + 1 + y^2 = 9$, see an opportunity to rewrite the first three terms as $(x+1)^2$ thus recognizing the equation of a circle with radius 3 and center $(-1, 0)$. See $\frac{x^2 + 4}{x^2 + 3}$ as $\frac{(x^2 + 3) + 1}{x^2 + 3}$, thus recognizing an opportunity to write it as $1 + \frac{1}{x^2 + 3}$.	7	Neutral
A-SSE.2-6	Use the structure of a polynomial, rational, or exponential expression to rewrite it, in a case where two or more rewriting steps are required.	i) An example from the 2009 College and Career Readiness Standards: Factor completely: $6cx - 3cy - 2dx + dy$. (A first iteration might give $3c(2x - y) + d(-2x + y)$, which could be recognized as $3c(2x - y) - d(2x - y)$ on the way to factoring completely as $(3c - d)(2x - y)$.) ii) Tasks do not have a context.	7, 1	Neutral

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A-SSE.3c-2	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression, where exponentials are limited to rational or real exponents. ★ c) Use the properties of exponents to transform expressions for exponential functions. <i>For example the expression 1.15^t can be rewritten as $\left(1.15^{\frac{1}{12}}\right)^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.</i>	i) Tasks have a context. As described in the standard, there is an interplay between mathematical structure of the expression and the structure of the situation such that choosing and producing an equivalent form of the expression reveals something about the situation.	1, 2, 4, 7	Neutral
A-SSE.4-2	Use the formula for the sum of a finite geometric series to solve multi-step contextual problems.	None	1, 7	Yes
A-APR.2	Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$, is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.	None	6	No
A-APR.6	Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form $q(x) + \frac{r(x)}{b(x)}$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.	i) Examples will be simple enough to allow inspection or long division. ii) simple rational expressions are limited to those whose numerators and denominators have degree at most 2.	1	Neutral
A-REI.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	i) Simple rational equations are limited to those whose numerators and denominators have degree at most 2.	3, 6	No
A-REI.4b-2	Solve quadratic equations in one variable. b) Recognize when the quadratic formula gives complex solutions.	i) Tasks involve recognizing an equation with complex solutions, e.g., “Which of the following equations has no real solutions?” with one of the options being a quadratic equation with non-real solutions. ii) Writing solutions in the form $a \pm bi$ is not assessed here. (N-CN.7)	7, 5	Neutral

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<http://www.corestandards.org/Math/Content/HSM>

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A-REI.6-2	Solve algebraically a system of three linear equations in three unknowns.	i) 80% of systems have a unique solution. 20% of systems have no solution or infinitely many solutions. ii) Coefficients are rational numbers. iii) Tasks do not require any specific method to be used. (e.g. prompts do not direct the student to use elimination or any other particular method).	1, 7	Item Specific
A-REI.7	Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.	i) Tasks have thin context or no context.	1	Item Specific
A-REI.11-2	Find the solutions of where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect, e.g. using technology to graph the functions, make tables of values or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, quadratic, polynomial, rational, absolute value, exponential, and/or logarithmic functions. ★	i) The “explain” part of standard A-REI.11 is not assessed here. For this aspect of the standard, see Sub-claim C.	1, 5	Item Specific
A.Int.1	Solve equations that require seeing structure in expressions.	i) Tasks do not have context. ii) Equations simplify considerably after appropriate algebraic manipulations are performed. For example, if $24 + 10x - x^2 = p - (x - 5)^2$ then find the value of p ; solve $(3x - 2)^2 = 6x - 4$.	7, 1	No
F-IF.4-2	For a rational, exponential, polynomial, trigonometric, or logarithmic function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums end behavior; symmetries; and periodicity.</i>	i) See illustrations for F-IF.4 at http://illustrativemathematics.org , e.g., http://illustrativemathematics.org/illustrations/649 , http://illustrativemathematics.org/illustrations/637 , http://illustrativemathematics.org/illustrations/639	6, 4	Yes

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F-IF.6-2	Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval with functions limited to polynomial, exponential, logarithmic and trigonometric functions. ★	i) Tasks have a context.	1, 4, 5, 7	Item Specific
F-IF.6-7	Estimate the rate of change from a graph. ★	i) Tasks have a context. ii) Tasks may involve polynomial, exponential, logarithmic, and trigonometric functions.	1, 4, 5, 7	Item Specific
F-IF.7c	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. c) Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.	None	1, 5, 6	Item Specific
F-IF.7e-1	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. e) Graph exponential functions, showing intercepts and end behavior.	None	1, 5, 6	Item Specific
F-IF.7e-2	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. e) Graph logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	i) About half of tasks involve logarithmic functions, while the other half involve trigonometric functions.	1, 5, 6	Item Specific
F-IF.8b	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. b) Use the properties of exponents to interpret expressions for exponential functions. <i>For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{\frac{t}{10}}$, and classify them as representing exponential growth or decay.</i>	None	7	Neutral

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F-IF.9-2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>Function types are limited to polynomial, exponential, logarithmic, and trigonometric functions.</i>	i) Tasks may or may not have a context.	1, 3, 5, 6, 8	Item Specific
F-BF.1b-1	Represent arithmetic combinations of standard function types algebraically.	i) Tasks may or may not have a context. ii) For example, given $f(x) = e^x$ and $g(x) = 5$, write an expression for $h(x) = 2f(-3x) + g(x)$. iii) More substantial work along these lines occurs in Sub-claim D.	-	Neutral
F-BF.2	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. ★	i) More substantial work along these lines occurs in Sub-claim D.	-	Item Specific
F-BF.3-2	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs, limiting the function types to polynomial, exponential, logarithmic, and trigonometric functions.	i) Experimenting with cases and illustrating an explanation are not assessed here.	5, 7	Item Specific
F-BF.3-3	Recognize even and odd functions from their graphs and algebraic expressions for them, limiting the function types to polynomial, exponential, logarithmic, and trigonometric functions.	i) Experimenting with cases and illustrating an explanation are not assessed here.	7	Neutral
F-BF.3-5	Identify the effect on the graph of a polynomial, exponential, logarithmic, or trigonometric function of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	i) Illustrating an explanation is not assessed here (see Sub-claim C).	3, 5, 8	Item Specific

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F-BF.Int.2	Find inverse functions to solve contextual problems. a) Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ or $f(x) = \frac{(x+1)}{(x-1)}$ for $x \neq 1$.	i) For example, see http://illustrativemathematics.org/illustrations/234 ii) As another example, given a function $C(L) = 750L^2$ for the cost $C(L)$ of planting seeds in a square field of edge length L , write a function for the edge length $L(C)$ of a square field that can be planted for a given amount of money C ; graph the function, labeling the axes.	1, 8, 6	Item Specific
F-LE.2-3	Solve multi-step contextual problems with degree of difficulty appropriate to the course by constructing linear and/or exponential function models.	i) Prompts describe a scenario using everyday language. Mathematical language such as “function,” “exponential,” etc. is not used. ii) Students autonomously choose and apply appropriate mathematical techniques without prompting. For example, in a situation of doubling, they apply techniques of exponential functions. iii) For some illustrations, see tasks at http://illustrativemathematics.org under F-LE.	1, 2, 6, 4	Item Specific
F-Int.1-2	Given a verbal description of a polynomial, exponential, rational, trigonometric, or logarithmic functional dependence, write an expression for the function and demonstrate various knowledge and skills articulated in the Functions category in relation to this function.	i) Given a verbal description of a functional dependence, the student would be required to write an expression for the function and then, e.g., identify a natural domain for the function given the situation; use a graphing tool to graph several input-output pairs; select applicable features of the function, such as linear, increasing, decreasing, quadratic, periodic, nonlinear; and find an input value leading to a given output value.	1, 2, 8	Neutral
F-Int.3	Solve multi-step contextual word problems with degree of difficulty appropriate to the course, requiring application of course-level knowledge and skills articulated in F-TF.B, F-IF.B, F-IF.7 limited to trigonometric functions.	i) F-TF.B is the primary content and at least one of the other listed content elements will be involved in tasks as well.	4, 2	Yes
F-TF.1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	None	6	Item Specific

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F-TF.8-2	Use the Pythagorean identity $\sin^2 \theta + \cos^2 \theta = 1$ to find $\sin q$, $\cos q$, or $\tan q$, given $\sin q$, $\cos q$, or $\tan q$, and the quadrant of the angle.	i) The “prove” part of standard F-TF.8 is not assessed here. See Sub-claim C for this aspect of the standard.	5, 7	Item Specific
S-ID.4	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	None	4, 2	Yes
S-ID.6a-1	Solve multi-step contextual word problems with degree of difficulty appropriate to the course, requiring application of course-level knowledge and skills articulated in S-ID.6a, excluding normal distributions and limiting function fitting to exponential functions.	None	1, 2, 5, 6, 4	Yes
S-ID.6a-2	Solve multi-step contextual word problems with degree of difficulty appropriate to the course, requiring application of course level knowledge and skills articulated in S-ID.6a limiting function fitting to trigonometric functions.	None	1, 2, 5, 6	Yes
S-IC.2	Decide if a specified model is consistent with results from a given data generating process, e.g., using simulation. <i>For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?</i>	None	2, 4	Neutral
S-IC.3-1	Recognize the purposes of and differences among sample surveys, experiments, and observational studies.	i) The "explain" part of standard S-IC.3 is not assessed here; See Subclaim D for this aspect of the standard. ii) See GAISE report, Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report	2, 4	Neutral
S-IC.Int.1	Solve multi-step contextual word problems with degree of difficulty appropriate to the course, requiring application of course-level knowledge and skills articulated in S-IC.	None	1, 2, 5, 6, 4	Yes
S-CP.Int.1	Solve multi-step contextual word problems with degree of difficulty appropriate to the course, requiring application of course-level knowledge and skills articulated in S-CP.	None	1, 2, 5, 6, 4	Yes
HS-Int.3-3	Solve multi-step contextual word problems with degree of difficulty appropriate to the course, requiring application of course-level knowledge and skills articulated in F-LE, A-CED.1, A-SSE.3, F-IF.B, F-IF.7.	i) F-LE is the primary content and at least one of the other listed content elements will be involved in tasks as well.	4, 2	Yes