

Depth of Knowledge Matrix – Algebra 2 (Integrated 3)

Topic	Rational Function Features	Square Root Function Features	Exponential Function Features	Logarithmic Function Features
CCSS Stand.	• F-IF.7d	• F-IF.7b	• F-IF.7e	• F-IF.7e
DOK 1 Example	Identify the function's vertical asymptote and its solution. $y = \frac{5}{x+8} + -3$	Find the domain and x-intercept of the square root function. $y = -5\sqrt{x+7} + 3$	Find the asymptote and y-intercept of the exponential function. $y = -5\sqrt{x+7} + 3$	Find the y-intercept of the logarithmic function. $y = -6 \log_5(x-4) + 3$
DOK 2 Example	Using the integers -9 to 9, at most one time each, fill in the boxes to create a rational function, its vertical asymptote, and its solution. $y = \frac{\square}{x + \square} + \square$ solution: $x = \square$ vertical asymptote: $x = \square$	Using the integers -9 to 9, at most one time each, fill in the boxes to create a square root function, its domain, and the x-intercept. $y = \square\sqrt{x + \square} + \square$ domain: $x \geq \square$ x-intercept: (\square, \square)	Use the digits 1 to 9, at most two times each, fill in the boxes to create an exponential growth function with its asymptote and y-intercept. $y = \square \cdot \square^{(x + \square)} + \square$ y-intercept: $(0, \square)$ asymptote: $y = \square$	Using the integers -9 to 9, at most one time each, fill in the boxes and create two logarithmic functions with the corresponding y-intercept. $y = \square \log_{\square}(x - \square) + \square$ y-intercept: $(0, \square)$
DOK 3 Example	Using the integers -9 to 9, at most one time each, fill in the boxes to create a rational function, its vertical asymptote, and the greatest possible solution. $y = \frac{\square}{x + \square} + \square$ solution: $x = \square$ vertical asymptote: $x = \square$	Using the integers -9 to 9, at most one time each, fill in the boxes to create a square root function, its domain, and the greatest possible x-intercept. $y = \square\sqrt{x + \square} + \square$ domain: $x \geq \square$ x-intercept: (\square, \square)	Use the digits 1 to 9, at most two times each, fill in the boxes to create an exponential decay function with its asymptote and greatest possible y-intercept. $y = \square \cdot \square^{(x + \square)} + \square$ y-intercept: $(0, \square)$ asymptote: $y = \square$	Using the integers -9 to 9, at most one time each, fill in the boxes to create a function with the greatest possible y-intercept. $y = \square \log_{\square}(x - \square) + \square$ y-intercept: $(0, \square)$

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Topic	Polynomial Function Features	Multiplying Complex Numbers	Trinomial Function Features	Equations of Circles
CCSS Stand.	• F-IF.7c	• N-CN.2	• F-IF.5	• G-GPE.1
DOK 1 Example	Find the roots of the function. $y = x^3 - 2x^2 + 4x - 5$	Multiply the binomials. $(3 + 4i)(2 + 3i)$	Find the range and roots of the function. $y = -4x^2 + 9x - 2$	Determine if the point is on the circle. $(x - 4)^2 + (y - (-3))^2 = 6^2$
DOK 2 Example	Using the integers -9 to 9, at most one time each, fill in the boxes to create a polynomial function with matching roots. $y = \square x^3 + \square x^2 + \square x + \square$ roots: $x = \square, x = \square, x = \square$	Using the integers -9 to 9 at most one time each, fill in the boxes twice: once to make a positive real number product and once to make a negative real number product. $(\square + \square i)(\square + \square i)$	Using the integers -9 to 9, at most one time each, fill in the boxes to create a function with the corresponding range and roots. $y = \square x^2 + \square x + \square$ roots: $x = \square, x = \square$ range: $y \geq \square$	Using the integers -9 to 9, at most one time each, fill in the boxes to create a circle and a point on the circle. $(x - \square)^2 + (y - \square)^2 = \square^2$ Point on circle: (\square, \square)
DOK 3 Example	Using the integers -9 to 9, at most one time each, fill in the boxes to create a polynomial function with matching roots that are as close together as possible. $y = \square x^3 + \square x^2 + \square x + \square$ roots: $x = \square, x = \square, x = \square$	Using the integers -9 to 9 at most one time each, fill in the boxes to make a real number product with the greatest value. $(\square + \square i)(\square + \square i)$	Using the integers -9 to 9, at most one time each, fill in the boxes to create a function with the corresponding range and roots that are as close together as possible. $y = \square x^2 + \square x + \square$ roots: $x = \square, x = \square$ range: $y \geq \square$	Using the integers -9 to 9, at most one time each, fill in the boxes to create a circle and a point on the circle with the point being as close to the origin as possible. $(x - \square)^2 + (y - \square)^2 = \square^2$ Point on circle: (\square, \square)