Content

Cluster Title: Solve equations and inequalities in one variable.
Standard A.REI.4: Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as *a ± bi* for real numbers *a* and *b*.
Concepts and Skills to Master
• Complete the square. • Solve quadratic equations, including complex solutions, using completing the square, quadratic formula, factoring, and by taking the square root. • Derive the quadratic formula from completing the square. • Recognize when one method is more efficient than the other. • Interpret the discriminant. • Understand the zero product property and use it to solve a factorable quadratic equation.

Supports for Teachers

Critical Background Knowledge	
• Factor • Simplify radicals • Understanding of complex numbers (Secondary II: N.CN.1) • Understand the real number and complex number systems (Secondary II: N.CN.1)	
Academic Vocabulary	
radicals, complex numbers, solve, factor, discriminant	
Suggested Instructional Strategies	**Resources**
Use of algebra tiles to demonstrate simple completing the square problems (see NCTM MTMS, March 2007, p. 403).	[Illuminations: Proof Without Words: Completing the Square](#)
Sample Formative Assessment Tasks	
Skill-Based Task: Solve the equation $6x^2 - x - 15 = 0$ by factoring and by completing the square. Justify each method using mathematical properties.	**Problem Task:** Solve the quadratic equation $49x^2 - 70x + 37 = 0$ using two methods. Describe the advantages of each method.