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| Solve equations and inequalities in one variable (Standards A.REI.4)   |  |
| <b>Standard A.REI.4:</b> Solve quadratic equations in one variable.  |  |
| <p>a. Use the method of completing the square to transform any quadratic equation in <math>x</math> into an equation of the form <math>(x - p)^2 = q</math> that has the same solutions. Derive the quadratic formula from this form.</p> <p>b. Solve quadratic equations by inspection (e.g., for <math>x^2 = 49</math>), 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 <math>a \pm bi</math> for real numbers <math>a</math> and <math>b</math>.</p> |  |
| Concepts and Skills to Master  |  |
| <ul style="list-style-type: none"> <li>Derive the quadratic formula from the form <math>(x - p)^2 = q</math>.</li> <li>Solve quadratic equations by inspection, using completing the square, quadratic formula, factoring, and by taking the square root; include those with complex solutions.</li> <li>Recognize when one method is more efficient than another method.</li> <li>Interpret the discriminant.</li> <li>Understand the zero product property and use it to solve a factorable quadratic equation.</li> </ul>   |  |
| Related Standards: Current Course  | Related Standards: Future Courses  |
| <a href="#">II.N.CN.1</a> , <a href="#">II.N.CN.2</a> , <a href="#">II.N.CN.8</a> , <a href="#">II.A.CED.1</a> , <a href="#">II.F.IF.7</a> , <a href="#">II.F.IF.8</a> ,<br><a href="#">II.F.IF.9</a> , <a href="#">II.F.BF.1a</a> , <a href="#">II.F.BF.3</a> , <a href="#">II.G.GPE.1</a>  | <a href="#">III.A.CED.1</a> , <a href="#">III.A.APR.1</a> , <a href="#">III.A.APR.2</a> , <a href="#">III.A.APR.3</a> , <a href="#">III.A.APR.4</a> ,<br><a href="#">III.F.IF.7</a> , <a href="#">III.F.IF.8</a> , <a href="#">III.F.IF.9</a> , <a href="#">III.F.BF.3</a> , <a href="#">III.G.GPE.2</a> , <a href="#">III.G.GPE.3</a> |

## Support for Teachers

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| Critical Background Knowledge  |
| <ul style="list-style-type: none"> <li>Evaluate square roots of perfect squares (<a href="#">8.EE.2</a>) and simplify radicals (<a href="#">8.NS.3</a>)</li> <li>Apply properties of operations to distribute and factor to create equivalent expressions (<a href="#">6.EE.3</a>, <a href="#">7.EE.1</a>)</li> <li>Solve equations (<a href="#">6.EE.7</a>, <a href="#">7.EE.4a</a>, <a href="#">8.EE.7</a>)</li> </ul> |
| Academic Vocabulary  |
| Completing the square, quadratic formula, complex numbers, factor, discriminant  |
| Resources  |
| <b>Curriculum Resources:</b> <a href="https://www.uen.org/core/core.do?courseNum=5620#71507">https://www.uen.org/core/core.do?courseNum=5620#71507</a>   |

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| Solve systems of equations. Extend the work of systems to include solving systems consisting of one linear and one nonlinear equation (Standards A.REI.7)  |  |
| <b>Standard A.REI.7:</b> Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. <i>For example, find the points of intersection between the line <math>y = -3x</math> and the circle <math>x^2 + y^2 = 3</math>.</i>   |  |
| Concepts and Skills to Master  |  |
| <ul style="list-style-type: none"> <li>Solve a simple system consisting of a linear equation and a quadratic equation (i.e., parabolas and circles) in two variables graphically and algebraically.</li> <li>Recognize the number of solutions a system of linear and quadratic equations may have (no solution, one solution, or two solutions).</li> </ul> |  |
| Related Standards: Current Course  | Related Standards: Future Courses  |
| <a href="#">II.A.CED.2</a> , <a href="#">II.A.REI.4</a> , <a href="#">II.F.IF.7</a>  | <a href="#">III.A.CED.2</a> , <a href="#">III.A.APR.1</a> , <a href="#">III.A.APR.2</a> , <a href="#">III.A.APR.3</a> , <a href="#">III.A.REI.2</a> , <a href="#">III.A.REI.11</a> , <a href="#">III.F.IF.7</a> , P.F.IF.7 |

## Support for Teachers

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| Critical Background Knowledge   |
| <ul style="list-style-type: none"> <li>Give examples of linear equations with one solution, infinitely many solutions or no solutions (<a href="#">8.EE.7a</a>)</li> <li>Understand that a solution to a system of two linear equations corresponds to points of intersection of their graphs (<a href="#">8.EE.8a</a>)</li> <li>Solve systems of linear equations (<a href="#">I.A.REI.6</a>)</li> <li>Identify the solutions of the equation <math>f(x) = g(x)</math> as the <math>x</math>-coordinates of the points where the graphs of the equations <math>y = f(x)</math> and <math>y = g(x)</math> intersect (<a href="#">I.A.REI.11</a>)</li> </ul> |
| Academic Vocabulary   |
| Resources   |
| <a href="https://www.uen.org/core/core.do?courseNum=5620#71516">Curriculum Resources</a> : <a href="https://www.uen.org/core/core.do?courseNum=5620#71516">https://www.uen.org/core/core.do?courseNum=5620#71516</a>  |