Understand solving equations as a process of reasoning and explain the reasoning (Standards A.REI.2).

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

**Concepts and Skills to Master**
- Solve rational equations in one variable.
- Solve radical equations in one variable.
- Identify extraneous solutions and explain the conditions that cause them.

**Related Standards: Current Course**
- III.A.APR.6, III.A.APR.7, III.A.SSE.1, III.A.SSE.2, III.A.CED.1, III.A.CED.3, III.A.CED.4, III.F.IF.8, III.F.BF.4

**Related Standards: Future Courses**
P.F.BF.1c, P.F.BF.4, P.F.IF.7d

**Support for Teachers**

**Critical Background Knowledge (Access Background Knowledge)**
- Producing equivalent forms of expressions (II.A.SSE.3)
- Rearranging formulas to highlight a quantity of interest (I.A.CED.4 and II.A.CED.4)
- Using the structure of an expression to identify ways to rewrite it (II.A.SSE.2)
- Know and use the properties to solve an equation (I.A.REI.1)

**Academic Vocabulary**
externeous solution

**Resources**
Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5630#71604
Represent and solve equations and inequalities (Standards A.REI.11).

**Standard A.REI.11:** Explain why the x-coordinates of the points where the graphs of the equations \( y = f(x) \) and \( y = g(x) \) intersect are the solutions of the equation \( f(x) = g(x) \); find the solutions approximately, for example, 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, polynomial, rational, absolute value, exponential, and logarithmic functions. ★

**Concepts and Skills to Master**

- Approximate solutions to systems of two equations using graphing technology.
- Approximate solutions to systems of two equations using tables of values.
- Explain why the x-coordinates of the points where the graphs of the equations \( y = f(x) \) and \( y = g(x) \) intersect are the solutions of the equation \( f(x) = g(x) \).
- Be able to express that when \( f(x) = g(x) \), the two equations have the same solution(s).
- Explain, in their own words, how the x-coordinate of a solution to the system \( y = f(x) \) and \( y = g(x) \) solves \( f(x) = g(x) \).
- Find approximate solutions for the system \( y = f(x) \) and \( y = g(x) \) using graphs or tables.
- Use successive approximations as a method to solve the system \( y = f(x) \) and \( y = g(x) \).

**Related Standards:**

- Current Course: III.A.CED.2, III.A.CED.3, III.A.REI.2, III.F.LE.5, III.F.TF.7
- Future Courses: P.A.REI.8, P.A.REI.9

**Support for Teachers**

**Critical Background Knowledge (Access Background Knowledge)**

- Understanding that the graph of an equation in two variables is the set of all its solutions plotted on a coordinate plane (I.A.REI.10)
- Explain why the x-coordinate is the solution of the system of equations where \( f(x) = g(x) \) (I.A.REI.11)

**Academic Vocabulary**

- system of equations, intersection, approximation, root, zero, solution

**Resources**

*Curriculum Resources:* https://www.uen.org/core/core.do?courseNum=5630#71607