Content Area: Math **Grade Level: HS Algebra 2**

Reporting Measure: Equations and Inequalities

Level	Description
Above & Beyond (4.0)	The student will: • Develop a strategy to solve equations and inequalities that include absolute values (for example, if an equation includes the absolute value of an expression, treat the absolute value expression as a variable, solve for it first, then split the equation into two parts which are equal to the positive and negative values of the expression on the other side of the equation, and solve each equation for the variable to produce two solutions).
3.5	In addition to score 3.0 performance, partial success at score 4.0 content
Proficient (3.0)	The student will: **EI1—Explain why the same amount or value can be added to or subtracted from both sides of an equation or inequality without changing the relationship it represents** (for example, compare an algebraic equation to a balance and explain that, as with an equation, adding equal weights to each side of a balance will result in the same relationship even though the total weight on the balance has increased). **EI2—Solve equations and inequalities in one variable** (for example, solve the equation $210(t - 5) = 41,790$ for t; solve the inequality $3x \leq 1000$ for x). **EI3—Express solutions to equations and inequalities in one variable algebraically and visually** (for example, plot the solution set $-1 \leq x \leq 17$ on a number line and using interval notation). **EI4—Determine if equations and inequalities in one variable have one solution, zero solutions, a defined range of solutions, or infinite solutions** (for example, determine that because there is no *x*-value that will make the equation $8(3x + 10) = 28x - 14 - 4x$ true, the equation has zero solutions).
2.5	No major errors or omissions regarding score 2.0 content, and partial success at score 3.0 content
Getting There (2.0)	**EI1—**The student will recognize or recall specific vocabulary (for example, *balanced*, *equation*, *inequality*, *unbalanced*) and perform basic processes such as: • Explain that the equality symbol in an algebraic equation represents a balanced relationship. For example, compare the equality symbol in an algebraic equation to the fulcrum of a balance with equal weights on both sides. • Explain that the inequality symbol in an algebraic equation represents an unbalanced relationship. For example, compare the *greater than* symbol in an algebraic inequality to the fulcrum of a balance with unequal weights on both sides. • State that algebra prioritizes balance over value. For example, explain that preserving the balance of an algebraic equation is more important than preserving the initial value of each side. **EI2—**The student will recognize or recall specific vocabulary (for example, *compound inequality*) and perform basic processes such as: • Separate compound inequalities into two separate inequalities before solving. For example, express $-5 \leq x - 4 \leq 13$ as $-5 \leq x - 4$ and $x - 4 \leq 13$ before solving each inequality.

	• Eliminate a term from one side of an equation or inequality by adding its opposite to both sides of the equation or inequality. For example, add -3 to both sides of the equation $9x + 3 = 21$ to produce the equation $9x = 18$. • Eliminate a coefficient from a term by dividing both sides of an equation or inequality by the coefficient. For example, divide both sides of the inequality $8x > 32$ by 8 to produce the solution $x > 4$. • Eliminate fractions from an equation or inequality by multiplying both sides of the equation or inequality by the least common denominator of any fractions within it. For example, multiply both sides of $7 - \frac{10}{x} = 2 + \frac{15}{x}$ by x to produce the equation $7x - 10 = 2x + 15$. • Eliminate radicals from an equation or inequality by isolating the radical on one side of the equation or inequality and raising both sides of the equation or inequality to the corresponding exponent. For example, in the equation $3 + \sqrt{5x + 6} = 12$, subtract 3 from both sides to isolate the radical on the left and then raise both sides to the second power to produce the equation $5x + 6 = 81$. • Reverse the inequality symbol when multiplying or dividing both sides of an inequality by a negative number. For example, when dividing both sides of $-4x < 135$ by -4, reverse the inequality to produce the solution set $x >- \frac{135}{4}$. **EI3—**The student will recognize or recall specific vocabulary (for example, *infinity*, *interval notation*, *solution set*, *union*) and perform basic processes such as: • Explain the notation used to plot solutions and solution sets on a number line. For example, a closed circle means the point is included, an open circle means the point is not included, a shaded line means the interval is included, and a shaded arrow means the interval includes positive or negative infinity. • Use interval notation to denote the solution set of an inequality. For example, use square brackets to indicate a closed interval (endpoint included) and parentheses to indicate an open interval (endpoint not included); always use parentheses when infinity is indicated; use the “union” symbol ∪ to indicate a set with two intervals. **EI4—**The student will recognize or recall specific vocabulary (for example, *infinite*) and perform basic processes such as: • State that if an equation resolves to the form $a = b$ where a and b are different numbers, there is no *x*-value that will make the equation true. For example, $-7x + 3 = 2x + 2 - 9x$ resolves to $3 = 2$; therefore, there are zero solutions. • State that if an equation resolves to the form $x = a$, there is one *x*-value that will make the equation true. For example, $-7 + 3 = 2x + 2$ resolves to $x =- 3$; therefore, there is one solution. • State that if an equation resolves to the form $a = a$, all *x*-values will make the equation true. For example, $-7x + 2 = 2x + 2 - 9x$ resolves to $0 = 0$; therefore, there are infinite solutions. • State that when solving compound inequalities, solutions must meet the constraints of both inequalities. For example, the solution set to $3y + 7 < 2y$ <u>and</u> $4y + 8 >- 48$ is the interval $(-14, -7)$ where the individual solution sets $y <- 7$ and $y >- 14$ overlap; there is no solution to the inequality $5x - 3 < 12$ <u>and</u> $4x + 1 > 25$ because the solution sets do not overlap; there are an infinite number of solutions to $5z + 7 < 27$ <u>or</u> $-3z \leq 18$ because the solution sets overlap and include positive and negative infinity.
1.5	Partial success at score 2.0 content, and major errors or omissions regarding score 3.0 content
Beginning (1.0)	With help, partial success at score 2.0 content and score 3.0 content