## SECTION FOUR: Draft High School Algebra

### 4A: Core Algebra Focus

The standards listed in this table name the priority instructional content for high school algebra (HSA). The right-hand column contains draft focus content that would be core content for all students in a student’s first two credits after K-8 mathematics. Specific modeling standards are indicated by a star symbol (★).

### HSA.SSE – Seeing Structure in Expressions

<table>
<thead>
<tr>
<th>Standard</th>
<th>Standard Statements (Jan 2021 Draft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSA.SSE.A.1</td>
<td>Interpret an expression which models a quantity by viewing one or more of its parts as a single entity and reasoning about how changes in these parts impact the whole, and vice versa. (★)</td>
</tr>
</tbody>
</table>
| HSA.SSE.B.3 | Create and recognize an equivalent form of an expression to understand the quantity represented in an authentic context.* (★)  
Integrated with Standard(s): HSA.SSE.B.3c, HSA.APR.A.1, HSA.SSE.A.2 |

### HSA.CED – Creating Equations

<table>
<thead>
<tr>
<th>Standard</th>
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</table>
| HSA.CED.A.1 | Define variables and create inequalities with one or more variables and use them to solve problems in real life contexts. (★)  
Integrated with Standard(s): HSA.CED.A.2 |
| HSA.CED.A.2 | Define variables and create equations with two or more variables to represent relationships between quantities in order to solve problems in real life contexts. (★)  
Integrated with Standard(s): HSA.CED.A.1, HSF.BF.A.1 |
| HSA.CED.A.3 | Represent constraints by equations or inequalities, and by systems of equations and/or inequalities; interpret solutions as viable or nonviable options in a modeling context. (★) |
| HSA.CED.A.4 | Rearrange formulas and equations to highlight a specific quantity. (★)  
Integrated with Standard(s): HSA.SSE.A.2 |

### HSA.REI – Reasoning with Equations & Inequalities

<table>
<thead>
<tr>
<th>Standard</th>
<th>Standard Statements (Jan 2021 Draft)</th>
</tr>
</thead>
</table>
| HSA.REI.A.1 | Construct a viable argument to justify a method for solving a simple equation.  
Integrated with Standard(s): HSA.REI.B.4, HSA.REI.A.2 |
| HSA.REI.C.6 | Solve systems of linear equations through algebraic means for simple systems and strategically using technology when needed.  
Integrated with Standard(s): HSA.REI.C.7 |
| HSA.REI.D.10 | Understand the solutions to an equation in two variables is a set of points in the coordinate plane that form a curve, which could be a line. |
| HSA.REI.D.11 | Recognize and explain why the point(s) of intersection of the graphs of f(x) and g(x) are solutions to the equation f(x)=g(x). Interpret the meaning of the coordinates of these points. (★)  
Integrated with Standard(s): HSA.REI.C.6 |
| HSA.REI.D.12 | Graph and explain why the points in a half plane are solutions to a linear inequality and the solutions to a system of inequalities are the points in the intersection of corresponding half planes. Interpret the meaning of the coordinates of these points in context. |
### 4B: Remaining Algebra Considerations

The concepts listed in this table represent remaining content that is often taught in high school but should only be attended to if students demonstrate proficiency in priority content. The right-hand column contains considerations where this content could be included, integrated, or excluded as well as reference standards for the identified remaining concepts.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Core Alignment Consideration (January 2021 Draft)</th>
</tr>
</thead>
</table>
| Rational Expressions           | **Eliminate** lessons on rational expressions in first two credits.  
**Possible integration** in advanced third credit courses if needed for modeling applications.  
Reference Standard(s): HSA.REI.A.2, HSA.APR.D.6, HSA.REI.A.2                                                                                     |
| Rewriting Expressions (Factoring) | **Limited** to factoring quadratics with technology in the first two credit courses.  
**Reduced** emphasis on paper and pencil methods in third credit courses.  
Reference Standard(s): HSA.SSE.A.2                                                                                                                                                  |
| Polynomial Arithmetic          | **Integrated** use with lessons with simple equivalent expressions across all courses.  
**Limited** to use with technology for complex and/or multi-step arithmetic.  
Reference Standard(s): HSA.APR                                                                                                                                                     |
| Systems of Equations           | **Limit** paper and pencil lessons to systems of linear functions, and combine using technology when possible.  
**Integrate** use of technology to solve systems that use nonlinear functions.  
Reference Standard(s): HSA.REI.C                                                                                                                                                     |
| Sequences & Series             | **Limited** lessons with modeling applications (e.g. HSF.BF.A.2) across all courses.  
Reference Standard(s): HSA.SSE.B.4, HSF.IF.A.3                                                                                                                                 |


4C: High School Algebra Crosswalk with Clarifying Guidance

CLUSTER: HSA.SSE – Seeing Structure in Expressions

**STANDARD: HSA.SSE.A.1**

**DRAFT Standards Statement (JAN 2021):**
Interpret an expression which models a quantity by viewing one or more of its parts as a single entity and reasoning about how changes in these parts impact the whole, and vice versa.

**DRAFT Clarifying Guidance (JAN 2021):**

Note:
Parts include terms, factors, coefficients, exponents, numerators and denominators.

MP

MP4: mathematical modeling

MP7: using structure

**Original CCSS Text (2010):**
Interpret expressions that represent a quantity in terms of its context.*

HSA.SSE.A.1.A Interpret parts of an expression, such as terms, factors, and coefficients.

HSA.SSE.A.1.B Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)^n as the product of P and a factor not depending on P.
**STANDARD: HSA.SSE.B.3**

**DRAFT Standards Statement (JAN 2021):**
Create and recognize an equivalent form of an expression to understand the quantity represented in an authentic context.

**DRAFT Clarifying Guidance (JAN 2021):**

Notes:

Algebraic manipulation for its own sake should be avoided.

Equivalent forms are found through application of algebraic properties including properties of exponents, combining like terms, and distributive property.

MP:

MP2, 7 & 8: quantitative & abstract reasoning, using structure & generalizing -- Equivalent forms are found through application of algebraic properties including properties of exponents, combining like terms, and distributive property.

**Original CCSS Text (2010):**

Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*

- **HSA.SSE.B.3.A** Factor a quadratic expression to reveal the zeros of the function it defines.
- **HSA.SSE.B.3.B** Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
- **HSA.SSE.B.3.C** Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15t can be rewritten as (1.151/12)12t ≈ 1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

**CLUSTER: HSA.CED – Creating Equations**

**STANDARD: HSA.CED.A.1**

**DRAFT Standards Statement (JAN 2021):**
Define variables and create inequalities with one or more variables and use them to solve problems in real life contexts.

**DRAFT Clarifying Guidance (JAN 2021):**

Full proficiency in creating inequalities arising from linear situations and developing proficiency for exponential situations is expected. Opportunities to explore simple quadratic and rational situations when called for by context are also included.

MP

MP4: mathematical modeling

**Original CCSS Text (2010):**

Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
STANDARD: HSA.CED.A.2

DRAFT Standards Statement (JAN 2021):
Define variables and create equations with two or more variables to represent relationships between quantities in order to solve problems in real life contexts.

DRAFT Clarifying Guidance (JAN 2021):
Full proficiency in creating equations arising from linear situations and developing proficiency for exponential situations is expected. Opportunities to explore simple quadratic and rational situations when called for by context are also included.

MP
MP4: mathematical modeling

Original CCSS Text (2010):
Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

STANDARD: HSA.CED.A.3

DRAFT Standards Statement (JAN 2021):
Represent constraints by equations or inequalities, and by systems of equations and/or inequalities; interpret solutions as viable or nonviable options in a modeling context.

DRAFT Clarifying Guidance (JAN 2021):
Full proficiency in creating and interpreting equations or inequalities arising from linear situations is expected. Opportunities to explore exponentials, simple quadratic and rational situations when called for by context are also included.

MP
MP4: Mathematical Modeling

Original CCSS Text (2010):
Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

STANDARD: HSA.CED.A.4

DRAFT Standards Statement (JAN 2021):
Rearrange formulas and equations to highlight a specific quantity.

DRAFT Clarifying Guidance (JAN 2021):
Full proficiency in rearranging linear equations and developing proficiency with exponential (solved via roots, not logs) is expected. Opportunities with simple quadratic and rational situations when called for by context are also included. MP - MP2: quantitative & abstract reasoning

Original CCSS Text (2010):
Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm’s law $V = IR$ to highlight resistance $R$. 
CLUSTER: HSA.REI – Reasoning with Equations & Inequalities

STANDARD: HSA.REI.A.1

DRAFT Standards Statement (JAN 2021):
Construct a viable argument to justify a method for solving a simple equation.

DRAFT Clarifying Guidance (JAN 2021):
Viable arguments must give reasoning for important steps. Supporting this work may also involve justifying algebraic rules through models.

Full proficiency in solving linear equations, quadratics which are solvable without factoring, completing the square or quadratic formula, exponentials solvable without logarithms and simple rational equations are expected.

MP

MP3: Construct arguments & critique the reasoning of others

Original CCSS Text (2010):
Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

STANDARD: HSA.REI.C.6

DRAFT Standards Statement (JAN 2021):
Solve systems of linear equations through algebraic means for simple systems and strategically using technology when needed.

DRAFT Clarifying Guidance (JAN 2021):
Simple systems of equations are those that could easily be solved by hand, including whole number coefficients and/or rational number solutions. Full proficiency with pairs of linear equations in two variables is expected. Opportunities with non-linear systems when called for by context are also included.

MP

MP5: Using graphing technology

Original CCSS Text (2010):
Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
**STANDARD: HSA.REI.D.10**

**DRAFT Standards Statement (JAN 2021):**
Understand the solutions to an equation in two variables is a set of points in the coordinate plane that form a curve, which could be a line.

**DRAFT Clarifying Guidance (JAN 2021):**

**Note:**
Common graphs include lines, parabolas, circles, and exponential curves

*Original CCSS Text (2010):*
Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

**STANDARD: HSA.REI.D.11**

**DRAFT Standards Statement (JAN 2021):**
Recognize and explain why the point(s) of intersection of the graphs of f(x) and g(x) are solutions to the equation f(x)=g(x). Interpret the meaning of the coordinates of these points.*

**DRAFT Clarifying Guidance (JAN 2021):**

**MP**
MP4: mathematical modeling
MP5: using graphing technology

*Original CCSS Text (2010):*
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, e.g., 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.*
STANDARD: HSA.REI.D.12

DRAFT Standards Statement (JAN 2021):
Graph and explain why the points in a half plane are solutions to a linear inequality and the solutions to a system of inequalities are the points in the intersection of corresponding half planes. Interpret the meaning of the coordinates of these points in context.

DRAFT Clarifying Guidance (JAN 2021):
Graphs can be created by hand in simple cases but in general with technology to allow the emphasis on the interpretations of solutions.

MP

MP4: mathematical modeling

MP5: using graphing technology

Original CCSS Text (2010):
Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.