# *Algebra I*

## *Course Level Expectations*

# ***Numbers and Operations***

1. Understand numbers, ways of representing numbers, relationships among numbers and number systems.

A. Read, write and compare numbers: MA 5 1.10

- compare and order rational and irrational numbers, including finding their approximate locations on a number line

B. Represent and use rational numbers: MA 5 3.3 DOK 3

- use real numbers and various models, drawing, etc. to solve problems

C. Compose and decompose numbers: MA 5 1.6 DOK 2

- use a variety of representations to demonstrate an understanding of very large and very small numbers

D. Classify and describe numeric relationships: none

2. Understand meanings of operations and how they relate to one another.

A. Represent operations: none

B. Describe effects of operations: MA 1 1.10 DOK 2

- describe the effects of operations, such as multiplication, division, and computing powers and roots on the magnitude of quantities

C. Apply properties of operations: none

D. Apply operations on real and complex numbers:
MA 1 1.10 DOK 2

- apply operations to real numbers, using mental computation or paper-and-pencil calculations for simple cases and technology for more complicated cases

3. Compute fluently and make reasonable estimates

A. Describe or represent mental strategies: none
B. Develop and demonstrate fluency: none
C. Compute problems: none
D. Estimate and justify solutions: MA 1 3.2 DOK 3

- judge the reasonableness of numerical computations and their results

E. Use proportional reasoning: MA 1 3.2 DOK 2

- solve problems involving proportions

# *Algebraic Relationships*

## 1. Understand patterns, relations and functions

A. Recognize and extend patterns: none

B. Create and analyze patterns: MA 4 1.6 DOK 2

- generalize patterns using explicitly or recursively defined functions

C. Classify objects and representations:

MA 4 1.6 DOK 3

- compare and contrast various forms of representations of patterns

D. Identify and compare functions: MA 4 1.6 DOK 2

- understand and compare the properties of linear and nonlinear functions

E. Describe the effects of parameter changes:

MA 4 1.6 DOK 2

- describe the effects of parameter changes on linear, exponential growth/decay and quadratic functions including intercepts

2. Represent and analyze mathematical situations and structures using algebraic symbols

A. Represent mathematical situations: MA 4 3.3 DOK 3

- use symbolic algebra to represent and solve problems that involve linear and quadratic relationships including equations and inequalities

B. Describe and use mathematical manipulation:
MA 4 3.2 DOK 2

- describe and use algebraic manipulations, including factoring and rules of integer exponents and apply properties of exponents (including order of operations) to simplify expressions

C. Utilize equivalent forms: MA 4 3.2 DOK 2

- use and solve equivalent forms of equations (linear, absolute value, and quadratic)

D. Utilize systems: MA 4 1.6 DOK 2

- use and solve systems of linear equations or inequalities with 2 variables

3. Use mathematical models to represent and understand quantitative relationships

A. Use mathematical models: MA 4 1.6 DOK 2

- identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem

4. Analyze change in various contexts

A. Analyze change: MA 4 1.6 DOK 3

- analyze linear and quadratic functions by investigating rates of change, intercepts and zeros

# *Geometric and Spatial Relationships*

1. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships

A. Describe and use geometric relationships: none

B. Apply geometric relationships: MA 2 3.6 DOK 2

- apply geometric properties such as similarity and angle relationship to solve multi-step problems in 2 dimensions

C. Compose and decompose shapes : none

2. Specify locations and describe spatial relationships using coordinate geometry and other representational systems

A. Use coordinate systems: none

3. Apply transformations and use symmetry to analyze mathematical situations

A. Use of transformations on objects: none
B. Use of transformations on functions: none
C. Use symmetry : none

4. Use visualization, spatial reasoning and geometric modeling to solve problems

A. Recognize and draw three-dimensional representations: none

B. Draw and use visual models: MA 2 3.3 DOK 3
- draw or use visual models to represent and solve problems

# ***Measurement***

## 1. Understand measurable attributes of objects and the units, systems and processes of measurement

A. Determine unit of measurement: none
B. Identify equivalent measures: none
C. Tell and use units of time: none
D. Count and compute money: none

## 2. Apply appropriate techniques, tools and formulas to determine measurements

A. Use standard or nonstandard measurement: none
B. Use angle measurement: none
C. Apply geometric measurements: none
D. Analyze precision: MA 2 1.7 DOK 2

- describe the effects of operations, such as multiplication, division and computing powers and roots on magnitudes of quantities and effects of computation on <u>precision</u> which include the judging of reasonableness of numerical computations <u>and their results</u>

E. Use relationships within a measurement system:
MA 4 1.6 DOK 2

- use unit analysis to solve problems

# *Data & Probablity*

1. Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them

   A. Formulate questions: MA 3 1.2 DOK 3

      - formulate questions and collect data about a characteristic which include sample spaces and distributions

   B. Classify and organize data: none

   C. Represent and interpret data: MA 6 1.8 DOK 3

      - select and use appropriate graphical representation of data and given <u>one-variable quantitative data</u>, display the distribution and describe its shape

2. Select and use appropriate statistical methods to analyze data

   A. Describe and analyze data: MA 3 1.10 DOK 2

      - apply statistical measures of center to solve problems

   B. Compare data representations: none

   C. Represent data algebraically: MA 3 1.6 DOK 2

      - given a scatterplot, determine an equation for a line of best fit

3. Develop and evaluate inferences and predictions that are based on data

A. Develop and evaluate inferences: MA 3 3.5 DOK 3

- make <u>conjectures</u> about possible relationships between 2 characteristics of a sample on the basis of scatter plots of the data

B. Analyze basic statistical techniques: none

4. Understand and apply basic concepts of probability

A. Apply basic concepts of probability: none

B. Use and describe compound events: none