Negative values are introduced with integers- the whole numbers and their negatives.

Integers

Introduce negative values using one of the contexts discussed like golf scores: Personalize the story to get the students engaged.

Addition and Subtraction

Operations with Integers

Exponents

Before algebra, students should have ample opportunity to explore exponents with whole numbers rather than with letters or variables.

*↖↖*

Quantity Contexts: Golf Scores, Money: Debts and Credits, and Linear Contexts.

Exponents in Expressions and Equations

Number line and arrow model

More examples are: Temperature, Altitude, Time Lines, and Football.

The quantity model is appropriate for take away and the number line can be used for either take away or comparisons.

Students’ first encounter with exponents should be squares and cubes, numbers that can be represented geometrically.

The irrationals together with the rational numbers make up the real numbers.

Irrational Numbers: these are not rational, meaning they cannot be put in fraction form.

Moving among Representations: A significant leap toward thinking about fractions as numbers is made when students begin to understand that a decimal is a representation of a fraction.

Rational Numbers: the set of all numbers that can be represented as a fraction.

Number Lines: A thermometer could be used as a number line because it shows the distance from zero.

Counters: teacher has counters in two different colors, one for positive counts and one for negative counts. Two counters of each type result in zero.

Two Models for teaching Integers:

Notations: because students have only seen the negative sign when doing subtraction, the symbolic notation for integers may be confusing.

Absolute Value: the distance between that number and zero.

Negative Numbers are defined in terms of whole numbers, Therefore the definition of negative 3 is the solutions to 3+?=0.

Meaning of Negative Numbers

Real Numbers

Like signs yield positive products, and unlike signs yield negative products.

Chapter 23

Multiplication of Integers should be a direct extension of multiplication for whole numbers.

Multiplication and Division

Do the same for very small numbers

Context for very large numbers: Connect to meaningful experiences.

Ex: The human body has about 100 billion cells

Scientific Notation

Explore the powers of 10 to explore because they are directly related to place value

Negative Exponents

Please Excuse My Dear Aunt Sally

Parentheses are used to group operations that are to be done first.

Multiplication and Division are always done before addition and subtraction.

Order of Operations

Students can also explore algebraic growing patterns involving squares and/or cubes