

## Grade 9-12 Unpacked Advanced Math Standards – Number Sense

**9-12.N.1.1A.** Students are able to **describe** the relationship of the real number system to the complex number system.

**Webb Level: 1**

**Bloom: Comprehension**

**Verbs Defined:**

**Describe:** Compare and contrast

**Key terms defined:**

Real Number System: The set of numbers consisting of the union of rational and irrational numbers.

Complex Number System: The set of numbers consisting of the union of imaginary and real numbers.

**Teacher Speak:**

Students are able to describe (compare and contrast) the relationship of the real number system to the complex number system.

**Student Speak:**

I can state the similarities between the real numbers and the complex numbers.

I can state the differences between the real numbers and the complex numbers.

I can find the absolute value (magnitude) of a complex number.

I can identify the parts (imaginary or real) of a complex number.

I can graph points in the complex plane.

Given a point in a complex plane, I can state its coordinate.

**9-12.N.1.2A.** Students are able to **apply** properties and axioms of the real number system to various subsets, e.g., axioms of order, closure.

**Webb Level: 1**

**Bloom: Application**

**Verbs Defined:**

**Apply:** Identify

**Key terms defined:**

Properties: A set of mathematical rules or laws that results in an equivalent expression.

Axiom: A basic assumption about a mathematical system from which theorems can be deduced.

Subset: A set that is contained within another set.

**Teacher Speak:**

Students are able to apply (use) properties and axioms of the real number system to various subsets, e.g., axioms of order, closure.

**Student Speak:**

I can identify the following properties of a subset:

- Closure under multiplication.
- Closure under addition.
- Associative property of addition.
- Associative property of multiplication.
- Commutative property of addition.
- Commutative property of multiplication.
- Distributive property of multiplication over addition/subtraction.
- Additive inverse property (Property of opposites).
- Multiplicative inverse property.
- Multiplicative property of zero (Zero product property).
- Identity property of addition.
- Identity property of multiplication.

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**9-12.N.2.1A.** Students are able to **add, subtract, multiply, and divide** real numbers including rational exponents.

**Webb Level: 2**

**Bloom: Application**

**Key terms defined:**

Real Number: Any number that can be graphed on the number line. This includes rational and irrational numbers.

Rational Exponent: A power that can be expressed as a rational number.

**Teacher Speak:**

Students are able to add, subtract, multiply, and divide real numbers including rational exponents.

**Student Speak:**

- I can add, subtract, multiply and divide:
  - Numerical expressions containing real numbers.
  - Expressions in radical form.
  - Numerical expressions containing rational exponents (powers that are rational numbers).
- I can simplify expressions that contain radicals.
- I can write an expression with a rational exponent in radical form and vice-versa.
- I can rationalize the denominator.

- I can simplify a complex fraction that contains expressions with rational exponents.

Working Document