Exponents and Roots

Students who study exponents and roots are learning to answer the questions

What is meant by an exponent that is not a natural number?

What are irrational numbers and where do they appear?

What is the best way to manipulate numbers that are very large or very small?

This unit of study addresses Indiana College & Career Ready Standards as follows:

8.C.2: Solve real-world and other mathematical problems involving numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Interpret scientific notation that has been generated by technology, such as a scientific calculator, graphing calculator, or excel spreadsheet.

8.NS.1: Give examples of rational and irrational numbers and explain the difference between them. Understand that every number has a decimal expansion; for rational numbers, show that the decimal expansion terminates or repeats, and convert a decimal expansion that repeats into a rational number.

8.NS.2: Use rational approximations of irrational numbers to compare the size of irrational numbers, plot them approximately on a number line, and estimate the value of expressions involving irrational numbers.

8.NS.3: Given a numeric expression with common rational number bases and integer exponents, apply the properties of exponents to generate equivalent expressions.

8.NS.4: Use square root symbols to represent solutions to equations of the form x^2 = p, where p is a positive rational number.

AI.RNE.1: Understand the hierarchy and relationships of numbers and sets of numbers within the real number system.

AI.RNE.2: Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

AI.RNE.3: Rewrite and evaluate numeric expressions with positive rational exponents using the properties of exponents.

Gaining skills in this unit will enable students to do everyday tasks like calculating interest on a credit card debt or estimating the remaining space on a flash drive. The specific skills in this unit of study include

- evaluating exponents
- evaluating negative and zero exponents
- using rules for exponents
- evaluating rational exponents
- using scientific notation
- performing operations on numbers in scientific notation
- using squares and square roots
- estimating square and cube roots