

**SAU 50
Grade 8
Mathematics
Exponents and Irrational Numbers**

Irrational Numbers: know irrational numbers.

Exponents: work with radicals and integer exponents.

SAU 50 District Competency:

Students will independently use their learning to choose and use the efficient format to express equivalency in a given situation. (.3333 or $\frac{1}{3}$ which is better?)

Essential Questions

- How is the number system used?
- How can I simplify the process of solving problems?
- How are subsets related to the system?

Acquisition

Students will demonstrate the following to meet the standards.

- I can convert a decimal expansion which eventually repeats into a rational number.
- I can use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions.
- I can distinguish between rational and irrational numbers determining the category of a given number (natural, whole, rational, irrational, real).
- I can evaluate perfect squares, square roots and small cube roots.
- I can apply the properties of integer exponents to generate equivalent numerical expressions.
- I can solve equations of the form $x^2=p$, $x^3=p$, where p is a positive rational number.
- I can evaluate square roots of small perfect squares and cube roots of small perfect cubes.
- I can perform operations with numbers expressed in scientific notation/decimals.
- I can estimate very large or very small quantities with the use of scientific notation.
- I can interpret scientific notation that has been generated by technology.

Standards

NH College and Career Ready Standards

Key to Standard Notation:

8.NS.1: 8 (*grade level*) **NS** (*domain: The Number System*) or **EE** (*Expressions and Equations*) **1** (*number of the standard*)

The Number System

Know that there are numbers that are not rational, and approximate them by rational numbers.

8.NS.1: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually and convert a decimal expansion which repeats eventually into a rational number.

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

Expressions and Equations

Work with radicals and integer exponents.

8.EE.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions.

8.EE.2: Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.

8.EE.3: Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.

8.EE.4: Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology.

[New Hampshire College and Career Ready Standards](#)

References:

National Governors Association Center for Best Practices, Council of Chief State School Officers. (2010). *Common Core Standards for Mathematics* (United States, National Governors Association Center for Best Practices, Council of Chief State School Officers). Retrieved August 10, 2016, from http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf

Math is fun/definitions. (n.d.). Retrieved April 17, 2017, from <http://www.mathisfun.com/definitions>