Minnesota
Curriculum Matrix for Mathematics

Minnesota Mathematics Strands/Standards/Benchmarks Grade 8	Common Core Mathematics Domains/Clusters/Standards Grade 8	National Essential Skills Study (NESS) Rankings Rank		NESS	MCA-III	Priority
Number & Operation						
Standard 8.1.1: Read, write, compare, classify and represent real numbers, and use them to solve problems in various contexts.						
8.1.1.1 - Classify real numbers as rational or irrational. Know that when a square root of a positive integer is not an integer, then it is irrational. Know that the sum of a rational number and an irrational number is irrational, and the product of a non-zero rational number and an irrational number is irrational. *For example*: Classify the following numbers as whole numbers, integers, rational numbers, irrational numbers, recognizing that some numbers belong in more than one category: $\frac{6}{3}$, $\frac{3}{6}$, $3.\overline{6}$, $\frac{\pi}{2}$, $-\sqrt{4}$, $\sqrt{10}$, -6.7.	**<u>The Number System</u>** **Know that there are numbers that are not rational, and approximate them by rational numbers.** 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.	M35	Use the properties of real (rational and irrational) numbers and demonstrate understanding of ordering and absolute value.	M	H	H

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8.1.1.2 - Compare real numbers; locate real numbers on a number line. Identify the square root of a positive integer as an integer, or if it is not an integer, locate it as a real number between two consecutive positive integers. *For example*: Put the following numbers in order from smallest to largest: $2,\ \sqrt{3}\ ,\ -4,\ -6.8,\ -\sqrt{37}$.	**<u>The Number System</u>** **Know that there are numbers that are not rational, and approximate them by rational numbers.** 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 (e.g., π^2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.* **<u>Expressions & Equations</u>** **Work with radicals and integer exponents.** 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 √2 is irrational.	M35	Use the properties of real (rational and irrational) numbers and demonstrate understanding of ordering and absolute value.	M	H	H
8.1.1.3 - Determine rational approximations for solutions to problems involving real numbers. *For example*: A calculator can be used to determine that $\sqrt{7}$ is approximately 2.65. *Another example*: To check that $1\frac{5}{12}$ is slightly bigger than $\sqrt{2}$, do the calculation $\left(1\frac{5}{12}\right)^2 = \left(\frac{17}{12}\right)^2 = \frac{289}{144} = 2\frac{1}{144}$.	**<u>The Number System</u>** **Know that there are numbers that are not rational, and approximate them by rational numbers.** 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 √2 is irrational.	M39	Apply techniques to obtain a rational approximation or estimate of a quantity or number (including irrational numbers such as radicals).	M	H	H

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8.1.1.4 - Know and apply the properties of positive and negative integer exponents to generate equivalent numerical expressions. *For example*: $3^2 \times 3^{(-5)} = 3^{(-3)}\left(\frac{1}{3}\right)^3 = \frac{1}{27}$.	**Expressions & Equations** **Work with radicals and integer exponents.** 1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.*	M20	Understand and apply the basic properties and laws of exponents and scientific notation to solve problems, including those with fractional, negative, and zero exponents.	M	H	H
8.1.1.5 - Express approximations of very large and very small numbers using scientific notation; understand how calculators display numbers in scientific notation. Multiply and divide numbers expressed in scientific notation, express the answer in scientific notation, using the correct number of significant digits when physical measurements are involved. *For example*: $(4.2\times10^4)\times(8.25\times10^3)=3.465\times10^8$, but if these numbers represent physical measurements, the answer should be expressed as 3.5×10^8 because the first factor, 4.2×10^4, only has two significant digits.	**Expressions & Equations** **Work with radicals and integer exponents.** 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. *For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.* 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 (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	M20	Understand and apply the basic properties and laws of exponents and scientific notation to solve problems, including those with fractional, negative, and zero exponents.	M	H	H